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THE SOUTHERN MEDICAL JOURNAL

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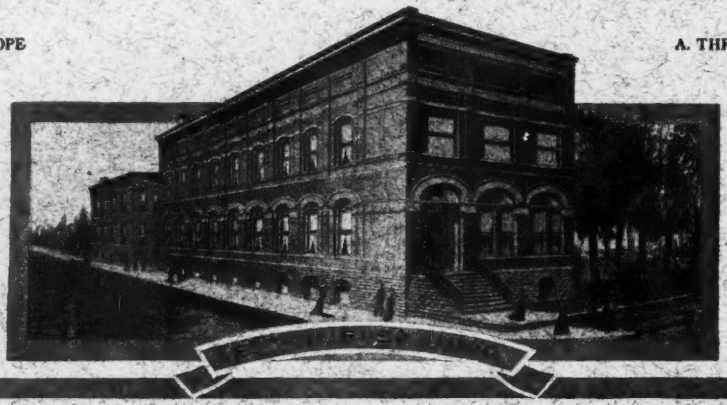

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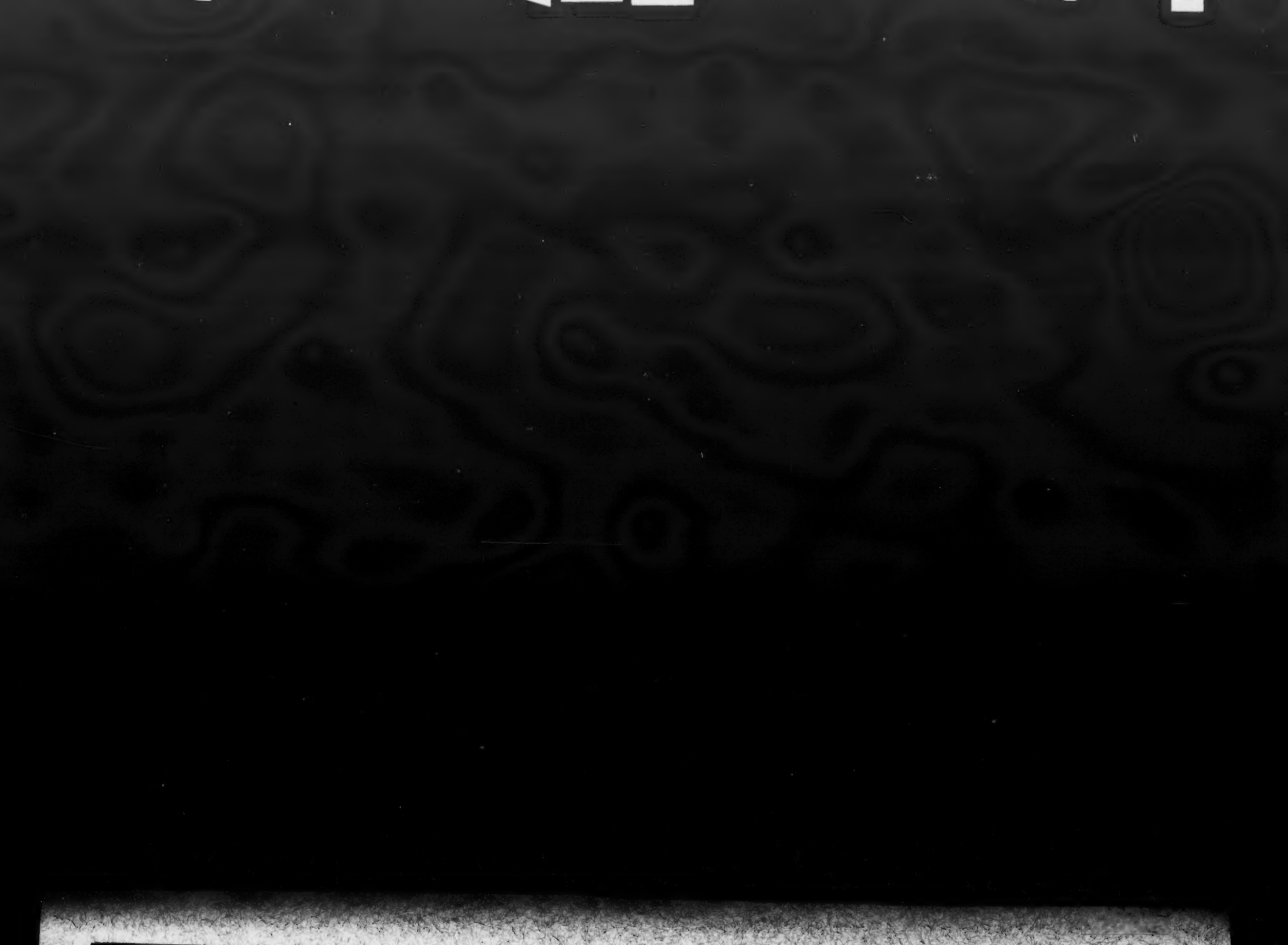

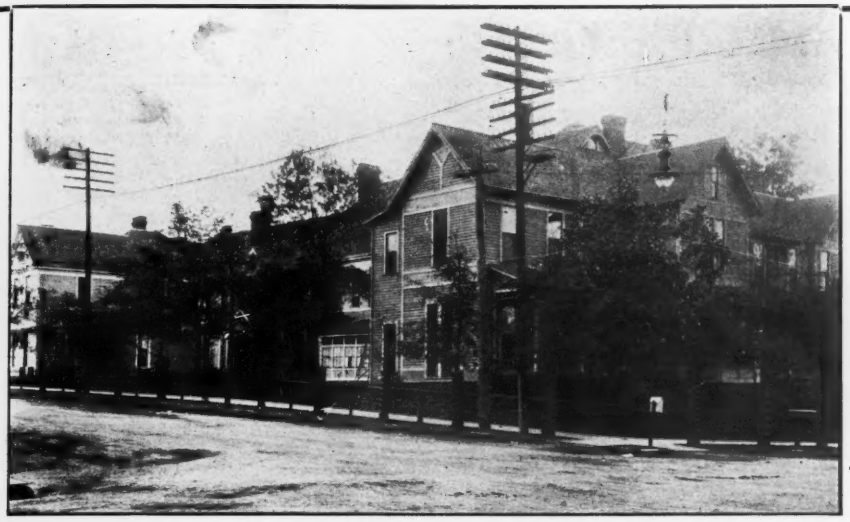

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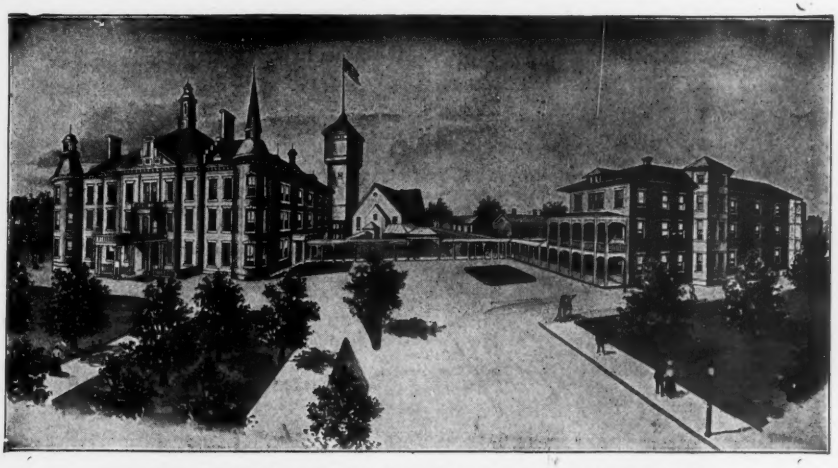

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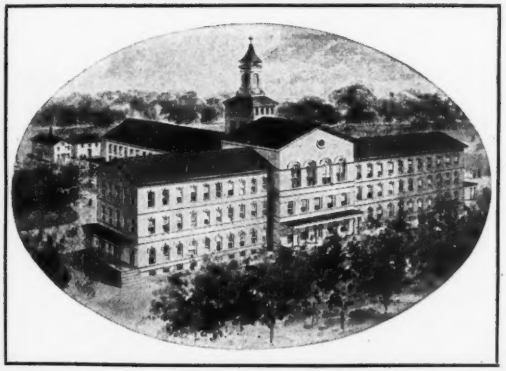

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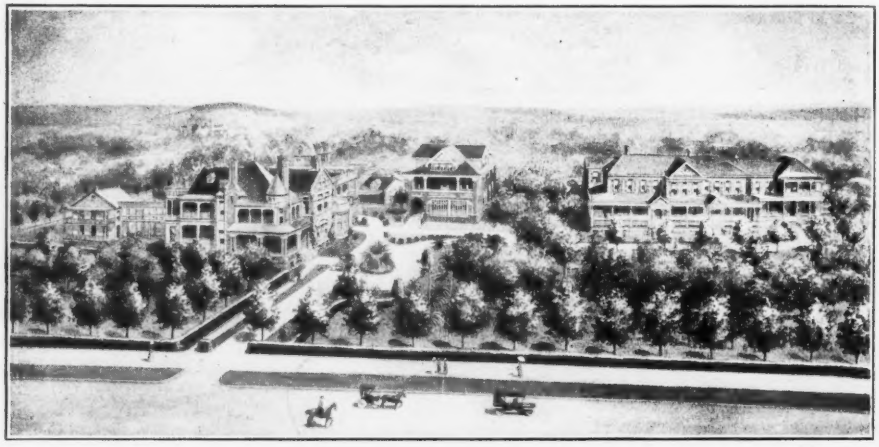

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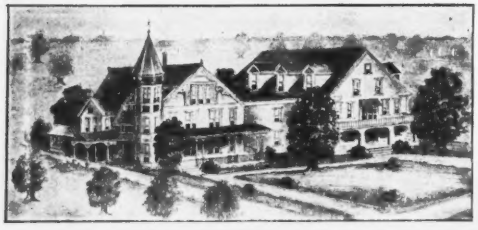

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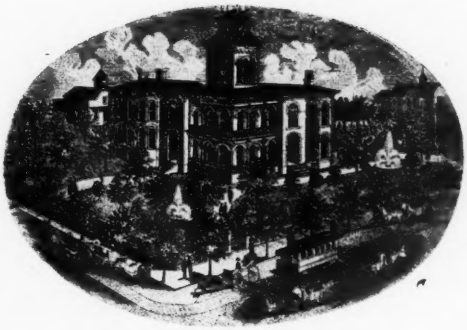

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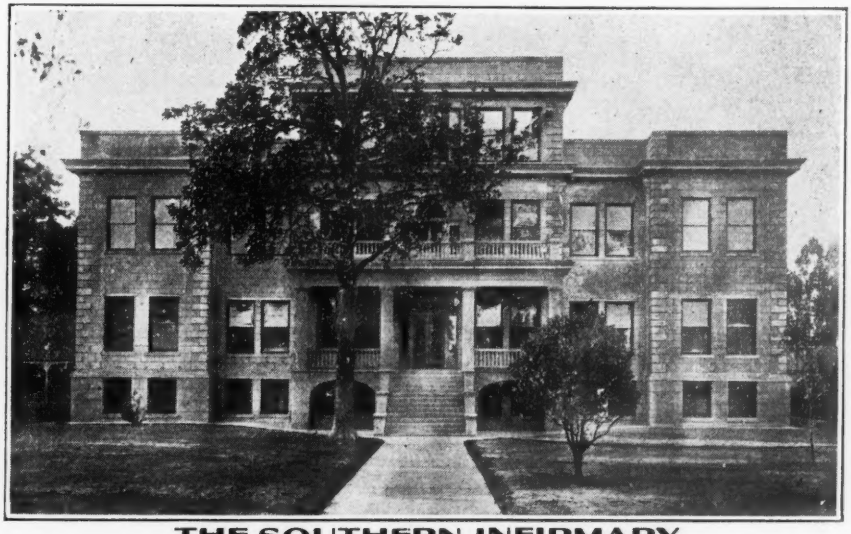

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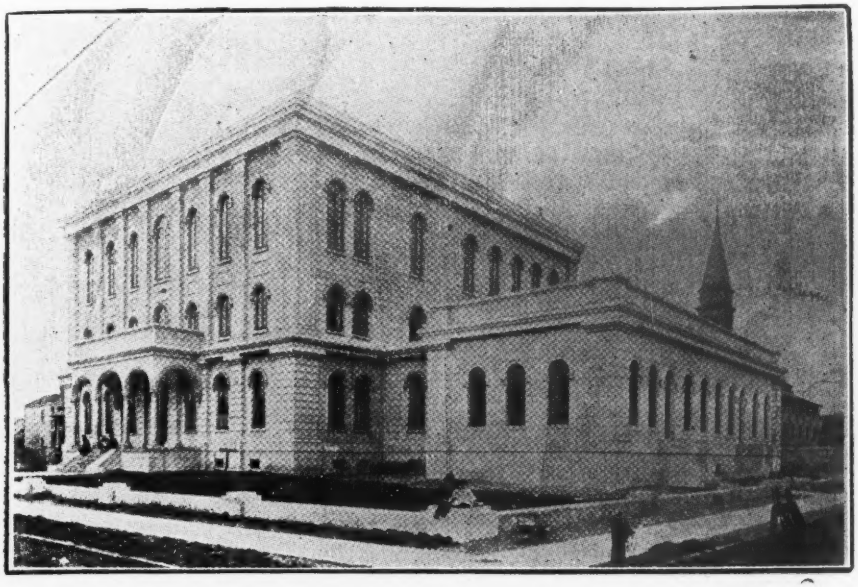

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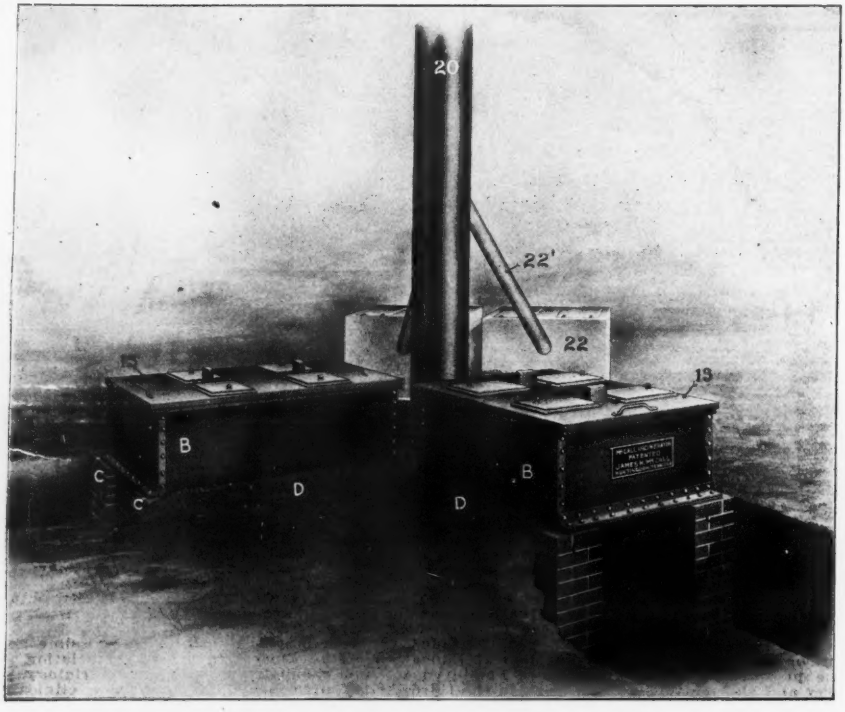

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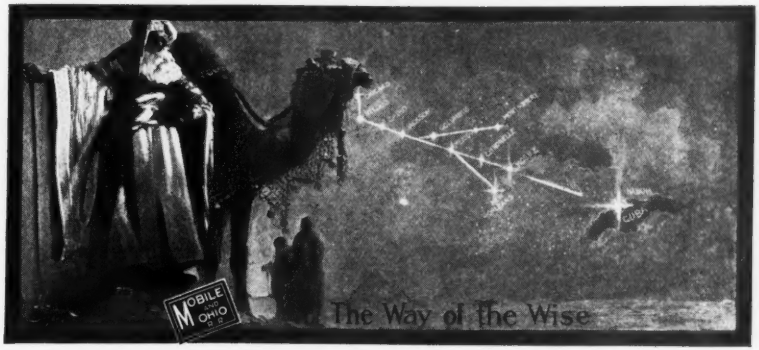

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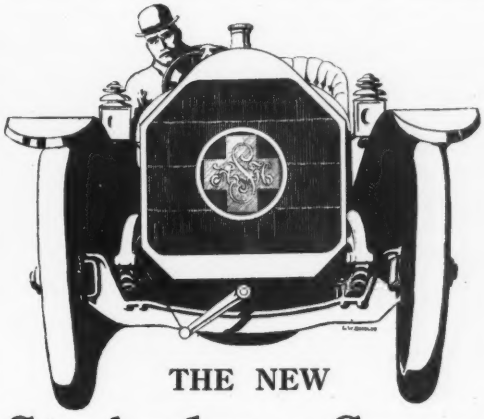

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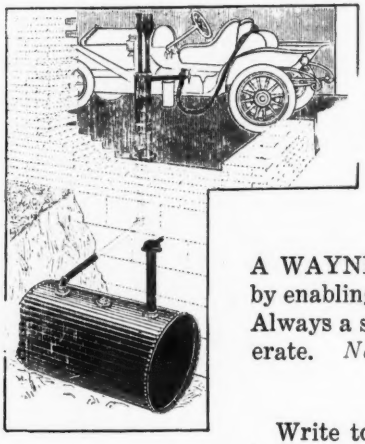

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ORIGINAL ARTICLES

ANEURYSM OF THE ARCH OF THE AORTA, WITH SPECIMEN.*

By J. B. MURFREE, A.M., M.D.,
Murfreesboro, Tenn.

An aneurysm is a tumor containing blood that communicates with the interior of an artery.

Aneurysms are divided into traumatic and idiopathic. The idiopathic forms are again divided into the tubulated, the sacculated and the dissecting.

The formation of an aneurysm is the result of a rupture at some point of one or more coats of an artery. The causes which are productive of an aneurysm are many.

Age exercises a slight controlling influence in the developing of aneurysms. It shows a great frequency between the ages of 30 and 40.

Sex also has an influence. Statistics show that the ratio of males to females is 5 to 1. Occupation acts as a predisposing cause, as hard workers, *i. e.*, the very muscular and robust, are chiefly afflicted.

Race: the Anglo-Saxon is said to be more subject to the disease than any other.

The determining causes of aneurysms are three. First, poisons which lead to changes in the coats of the vessels. Among these are the infectious diseases—typhoid and scarlet fever, pneumonia, etc. But among the infectious diseases syphilis takes the first rank. Alcohol is one of the determining causes, some times directly, but more often indirectly, by producing permanent high arterial tension, as those conditions which produce and keep up high arterial tension tend to produce aneurysms. The strain of muscular effort, especially after the thirteith year, when the vital rubber begins to lose its elasticity.

Embolism is sometimes the cause of an aneurysm, but atheroma is not so frequently the cause of aneurysms as it has the reputation of being.

High blood pressure is another cause. External trauma sometimes acts as a determining cause.

The two prominent types of aneurysm of the aorta are the tubulated—cylindrical or fusiform—and the sacculated. The sacculated, in which there is a protrusion on one side of the wall, is the more frequent type.

When uninterrupted, the natural tendency of an aneurysm is (very rarely) to a spontaneous cure, or more frequently to death. When a spontaneous cure does takes place it is due to an inflammatory action in its lining membrane which produces a fibrination of the blood, whereby clotting results and the cavity is closed by the solid blod or by a thrombus forming in the tumor and being washed into the afferent vessel, which produces a stasis of the blood, followed by coagulation. But the most frequent termination of an aneurysm is by death, which event is caused by

1. Rupture of the sac producing a fatal hemorrhage;

2. By pressure on important organs;

*Read before the Section on Medicine of the Southern Medical Association, Nashville, Tenn., November 8-10, 1910.

3. To septicemia and pyemia;
4. To embolism.

All the causes here enumerated and the natural tendencies of an aneurysm are all applicable to aneurysm of the aorta.

Aneurysm of the arch of the aorta may consist in a uniform dilatation, but it is more common to have one or other portión involved in a saccular aneurysm, situated in a sinus of valsalva, the ascending or the transverse portion of the arch.

Aneurysm of the ascending aorta. Perhaps the most common situation for the saccular tumor is from the convexity of the aorta an inch or so above the valve. The tumor grows freely to the right, displacing the vena cava, and the lung, and some of the largest sacs are met with or originate in this situation. Anteriorly it appears to the right of the sternum, the second and third interspaces, and may gradually erode the bone and cartilage, and pressing upwards the sternoclavicular joint appears as a large external tumor.

Aneurysm of the transverse arch, owing to the very small space between the spine and the sternum, the tumor here is restricted in its growth, and is likely to cause early and severe symptoms from pressure, particularly upon the windpipe. The left recurrent laryngeal nerve is involved, and changes in the voice, attacks of dyspnoea and painful dysphagia are common. Small tumors may cause the most intense symptoms without indeed any physical signs. Although in this situation the sac, as a rule, does not grow to such a size, yet there are instances in which the extension laterally has been enormous, producing some of the largest and most chronic types of aneurysm. Growth backward may involve the spine, producing agonizing pain.

The transverse portion of the aorta has but little movement, and it lies in close proximity to a number of important organs, pressure on which may early give rise to characteristic symptoms. Posterior to it we have the trachea, the thoracic duct and the oesophagus, and between it and the trachea is the deep cardiac plexus, the left recurrent laryngeal nerve passes around it and ascends toward the trachea; posteriorly in front is the left vagus and left phrenic nerves and the two superficial cardiac nerves from the sympathetic and the pneumogastric nerves, which cross its anterior surface. Above is the left innominate vein. Below is the bifurcation of the pulmonary artery, the left bronchus and the left recurrent laryngeal nerve. The transverse portion of the arch is deeply placed and more or less firmly fixed and in such close relation with important structures that a projection from its surface cannot elude or be eluded by the surrounding parts. Hence an aneurysm of this portion of the aorta before it attains any great size usually gives rise to symptoms from pressure on adjacent structures, symbols of which are a brassy cough and a cracked voice, or tracheal breathing, difficulty of deglutition may be the indications. Hence Broadbent has denominated aneurysms of the transverse aorta aneurysms of symptoms.

The symptoms of aneurysms of the arch of the aorta are many and varied; one or other of them will present themselves according to the situation of the aneurysm.

These are pressure: First, pressure on the left recurrent nerve, which gives rise to the cracked voice; second, pressure on the trachea, oesophagus, and thoracic duct will produce dyspnoea—the tracheal tug and emaciation, and difficulty of breathing.

Pressure on the coelio-spinal branch of the sympathetic may cause dilatation or contraction of the left pupil.

There will be a difference between the radial pulses. On palpation of the chest we may detect pulsation on the chest wall, and if the aneurysm is anterior the sac may present a pulsating tumor in the second or third interspace, and sometimes pulsation may be felt by pressing the finger down behind the sternal notch, but care must be taken not to mistake a dilated aorta for an aneurysm.

On percussion, dullness over the manubrium

and to the left of it may often be made out early.

On auscultation, tracheal breathing may be recognized. The aortic second sound will be louder and more distinct to the left of the manubrium. A systolic murmur is sometimes heard.

The course of the disease, owing to the important structures by which the aneurysm is surrounded, is not so prolonged as in other localities, and usually symptoms are early manifested.

"It never attains the great size sometimes seen in aneurysms of the ascending aorta, and usually proves fatal at a much earlier period." Posteriorly it may ulcerate through and rupture into the trachea, the left bronchus, the oesophagus, or it may rupture into the left pleura, lung, or into the mediastinum. Death may occur from complication caused by the pressure.

The pressure effects of an aneurysm on adjacent structures are very decided and sometimes quite destructive.

An aneurysm may compress and obstruct the flow of blood through one of the large veins and thereby produce oedema.

Pressure upon a bronchus will cause a diminished entry of air into the corresponding lung. When the sac of an aneurysm is against a bony part an erosion to a greater or less extent will result. In fact, pressure upon any of the adjoining structures will produce characteristic results.

The diagnosis of an aneurysm of the arch of the aorta can usually be made by a careful consideration of the symptoms and signs already detailed. Ever bearing in mind that expansile pulsation is the true diagnostic sign of an aneurysm anywhere located.

The X-ray may very greatly aid in our diagnosis in doubtful cases.

At this point I would beg to report the following case:

On October 9, 1908, John S. consulted me in regard to a tumor on his chest. He was 55 years of age, a German by birth, a shoemaker by trade, and unmarried. He denied ever having had syphilis; he was intemperate and often drank to excess. He was a small man, thin, and of a pale, cadaveric look.

He gave the history of being annoyed by this tumor for a long while, and said that it was continually growing larger and more painful. The pain at times was severe and he suffered with difficulty of breathing.

On examination I found a soft tumor about the size of a small hen's egg, situated on the anterior of the chest on the sternum in the median line near the top of the manubrim. On palpation there was a heaving of the chest wall, and pressure upon the tumor revealed an expansile pulsation. Around the sides of the tumor could be felt the hard borders of the sternum, and in the center the soft pulsating tumor, which could be pressed beneath the sternum.

An aneurysm of the arch of the aorta was readily recognized.

He was directed to secure absolute rest and to reduce his diet to a minimum, avoiding all active exercise, while the iodide of potash was prescribed internally. He was so feeble and having no home, and being without means, he was admitted into the county asylum, where he spent the winter under the care of Dr. S. B. Smith, the asylum physician, from whom I learned that the growth of the tumor, with dyspnoea and pain, continually increased.

I saw him again on the 1st of May, 1910, at the asylum. At this time his suffering was very great, the pain being very intense and the dyspnoea was so great that he could not lie down, but sat up all the time, with his face buried in his hands and his elbows resting on his knees. In this way only could be obtain any sleep.

The aneurysm sac had greatly enlarged and now projected through and above the manubrium, forming a tumor of the size of a large orange, near the center of which was a beginning ulceration the size of a quarter of a dollar.

On the 4th inst. there was a rupture at the

ulcerated point and a profuse hemorrhage ensued, but a coagula formed in the opening which arrested the hemorrhage.

On the night of the 7th the hemorrhage returned more profuse than the first and his life rapidly passed out.

An autopsy was made by Drs. S. B. Smith and M. B. Murfree. The body was thin and emaciated. Aneurysmal sac was ruptured for two inches, and the remaining wall was thin and easily torn, being filled with clotted blood. The sternum at its upper part was completely destroyed and costal cartilages of the first, second and third ribs were worn away. The sac was found to have sprung from the anterior part of the transverse arch of the aorta.

The remarkable extent of ulceration and destruction of the sternum and ribs is very unusual.

The treatment of aneurysm of the arch of the aorta divides itself into the palliative and the curative. But as a matter of fact the cures resulting from treatment are so very few that we can scarcely look upon it as a curable malady.

When diagnosed early, they can be greatly benefited by treatment and in some instances a cure is effected. This is very seldom.

"In the treatment of aortic aneurysm the object to be attained is to keep down the blood pressure to render the circulation as slow and equable as possible; to diminish the volume of the blood, and to increase its coagulability. We shall thus reduce the strain on the walls of the aneurysm to a minimum and favor the coagulation of blood in the sac."

The means best adapted to accomplish these ends is rest—absolute rest in a recumbent posture for two months, and a reduction in the diet to the smallest amount possible.

The use of drugs is of but little value; however, the iodide of potash has seemingly done good, but aside from this remedy there is none of any value. Ergot has been much used, but has not been effective.

Generally we have to treat the symptoms as they arrive.

Aperients must be given to avoid constipation. Bromides and sedatives to relieve nervousness and a hyperdermic of morphia to relieve severe pain.

Venesection may be used to a very moderate extent to great advantage. It relieves the pain and also lessens the amount of blood in the circulation, thus affording a chance for fibrin to be deposited.

The surgical treatment of aneurysm of the aorta does not often find an opportunity of being utilized except by ligature of the right subclavian and carotid arteries when the innominate is involved, or the corresponding vessels on the left side when the carotid and subclavian of that side is involved.

The introduction of coils of fine wire into the sac and the action of galvanic currents have been tried, but have not met with much encouragement.

Injections of a solution of gelatine into the buttocks to increase the coagulability of the blood have been practiced, but its usefulness is not fully demonstrated. Preparations of calcium have also been administered in large doses with seeming success in coagulating the blood.

The course of thoracic aneurysm tends to death, and satisfactory treatment can only be hoped for when the aneurysm is saccular with a relatively small neck to the sack.

DISCUSSION.

Dr. Glasgow.—"I would like to report an interesting case of aneurysm of the descending arch of the aorta. It was one of a negro man who was taken two years before with a pain in his chest. We could make out no visible signs. By making him rest and putting him on mercury and KI he seemingly recovered, and went to work for two years. I was again called in. The heart seemed not to be enlarged. There were no symptoms but pain in the chest. Examination showed no change in voice or the pulse, with no indication of aneurysm. I put ice bags to his side, purged him, and gave KI, and after a while the pain disappeared and he got up and went to work. One day there was a sudden gush of blood and he died. I held an autopsy, and found an aneurysm of the descending arch of the aorta, near the lung. Opening the pleural cavity, I saw signs of an old pleurisy. There was nothing abnormal with the heart. The aneurysm was the size of a cocoanut. It had ulcerated and ruptured into the lung, so we could see the bronchus where the blood escaped. It was a very interesting case.

I simply mention this case to show the difficulty of diagnosis when located in this region."

Dr. Frank Jones, Memphis.—Dr. Murfree's paper has so fully covered the ground on aneurysm of the aorta that I don't see that there is anything to be said further than that which has been expressed. It has been my misfortune to see a great many of these cases. Unfortunately in all of these cases, and it occurs with all of us, unless an early diagnosis is made, little can be done, and then only through palliative measures. I have become something of a skeptic as to even doing much in that way. There is the possibility, in the hands of the right young physician, of confusing aneurysmal growths. Broadbent made the statement that he had made the mistake in two instances where the growths were not aneurysmal, but were mediastinal growths. The symptoms are very much alike. However, Broadbent has given us a very classic division and one that has some interpretation to it. Now the aneurysm that produces symptoms is the aneurysm of the transverse aorta, and the symptoms are due to pressure. There is only one thing to discuss, and that is the confusion with the mediastinal growths. I have seen cases where there were nothing but the symptoms to go by, and we had to reach a conclusion by exclusion. There was no erosion of the sternum, and if the sack is pushed back, you have no such erosion. If you have an aneurysm of the transverse arch, the displacement of the heart is not a pathological displacement but a mechanical displacement and sagging of the sack. There may be marked displacement of the apex beat in some cases. Mediastinal growths will produce a displaced apex beat. I was called to Greeneville, Miss., in a case where there was doubt as to whether it was an aneurysm of the aorta, in which there was a displacement of the apex beat, but not in keeping with the text-books, being up in the right nipple line, pressed up. The history of the case was very clear that it was a mediastinal growth instead of an aneurysmal growth. I have never seen an aneurysm of the arch of the aorta unless there was clearly a history of syphilis. Nearly all cases of aneurysm imply syphilis in some way. I wish to thank Dr. Murfree for his excellent paper."

CANCER OF THE CERVIX UTERI---ITS TREATMENT.*

By A. G. PAYNE, M.D.,
Greenville, Miss.

The cervix uteri is affected with cancer more frequently than any other portion of the body; fully one-third of all women who die of cancer are the victims of uterine cancer, and cancer of the cervix is pre-eminently a disease of the child-bearing period.

In cervical cancer, woman finds the sovereign affliction of her sex, and the sum total of misery; in loathsomeness, hopelessness, mental anguish and fatality, it exceeds all others.

Pathology teaches us that every cancer in its beginning is a limited local disease, and that cancer can be cured if the entire area involved is removed. But alas! what per cent of cases of cervical cancer comes to the surgeon when it is a local disease?

It is a rare case, indeed, that cancer of the cervix is discovered by the aid of the microscope when it had not previously been suspected or discovered by some clinical sign or symptom. Who is to blame for such a state of affairs existing? The profession largely, but not wholly, on account of procrastination in cases of hemorrhage, ulcers and foul smelling discharges that they are called on to treat, in not having a tissue examination made by a competent pathologist, and by not educating the women, especially during the cancer period, in such a way that signs and symptoms would lead them to consult competent medical advice before her chances of recovery, by complete extirpation, were less than 20 per cent even in the most skilled hands as operators.

What is true of malignant conditions in general is true of cervical cancer. The early stages are, as a rule, marked by an entire absence of symptoms, and if symptoms exist at all, they are usually paid no attention to by the woman until she has a severe haemorraghae, or a foul-smelling leukorrhea, or pain of unusual severity, until the disease has advanced beyond the reach of human skill.

Atypical uterine bleeding is perhaps the most usual and truest worthy symptom that we have, while a leukorrheal discharge which

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is usually yellowish, acrid and more or less malodorous in character, is always to be regarded with grave suspicion; therefore, to lay special stress upon symptomatology, the two chief danger signs are—an atypical haemorraghic flow, either at or between the menstrual period and a more or less profuse leukorrheal discharge in women about mid-life. If either of these symptoms occur shortly before, during or after the menopause, no physician is justified in treating the case for a week or even a day, without making a thorough examination to ascertain, if possible, its cause.

From the foregoing it is imperative that the physician should be on the alert to detect the slightest symptom pointing to cancer, and to make a bimanual and specula examination of the cervix when there is the slightest pointing to malignancy, and resort to diagnostic curretage where cancer of the fundus is suspected.

In either case, before any operative interference is attempted, there should be an examination made by a competent pathologist, who should be given some idea of the case symptomatically and clinically.

If the judgment of a skilled pathologist is followed, fewer mistakes will be made in clinically doubtful cases, than if the clinical side of this question alone is followed. By following this policy not a few women will be saved from hysterectomy in which there is no cancer, whereas, others will be hurried at once to a successful operation, who otherwise would have been permitted to go until too late for a cure.

Pan hysterectomy is the only operation by which we can offer a woman with cervical cancer any permanent benefit or results, and then only in case there has been no extension into bladder, vagina, rectum or glands. As soon as the disease, even only as microscopically demonstrated, spreads beyond the cervix, a recurrence is inevitable, and only paliative treatment, operative or otherwise, is indicated.

Pan hysterectomy is the most difficult, also most dangerous gynecological operation that a woman is ever offered or has to undergo, and should only be offered her when we are sure that there has been no extension into surrounding tissues. for such operation is fraught with too many dangers, with too little hope of doing any permanent good when such conditions exist.

There is no one such condition found in the whole domain of surgery in which we have to be honest with our patients and ourselves, tell them that as far as surgery goes the door of hope has closed to them. This is inded harrowing, and a step that is hard to make, but this is one of the main conditions in surgery in which on account of the pathological condition it is best left alone without operative interference.

There are a great many good men doing gynecology, and some writers of text-books on the same, warm adherents of vaginal hysterectomy, but in my opinion vaginal hysterectomy should never be done for carcinoma of uterus only, as Kelly and Cullen advise, in exceptional cases—very fat women and such cases, when the abdominal route cannot be adopted. The abdominal operation is the most rational for carcinoma of the cervix, since by its employment the most extensive removal of the parametric tissue is made possible, adjacent involved glands removed, less liability to wound uterus, careful suturing of the incision, accurate covering with peritoneum and carefully applied drainage.

So far I have only mentioned cancer in the supposed curative by extirpation stage, but, as by far the greater number are beyond doing any permanent good by such means, when they come under observation, something must be done to allay their suffering, symptoms and fears. By what means are we able to be of any benefit to such cases? Curretage in some cases does a great deal of good. I have curretted some of these cases, when it seemed as though they would never have vitality to leave their beds, recuperate beyond all expectation, go for years in fairly good health Have used actual cautery, to try to check

haemorraghae, which would only suffice for a time, and then come again in such force as to cause fear that the patient would succumb to loss of blood in the office from a digital examination, who by simply the "leave alone" plan would give no more trouble until a metastasis in some other organ would cause their death.

This shows that in these conditions we must treat different cases as seems best for them.

In palliative treatment, my opinion is that we should be humane, not use chloride of zinc or any other caustic measure, which will almost invariably give great pain, and will be of no avail. Opium is the sheet anchor in these incurable cases, and it is our duty to make these people as comfortable as possible. Papain is less liable to diminish secretion, constipate or cause nausea, and seems best suited, as well as less liable to make habitues, in case, per chance, a permaennt cure could be effected.

DISCUSSION.

Dr. C. N. Cowden, Nashville.—"If we ever do anything for cancer it must be done by early examination and early diagnosis. Certainly nothing more can be expected from surgery beyond what Clark, Wertheim and others have advised for the cure of cancer—that is, total extirpation. It is conceded by all that in the early stages cancer is a local disease, and that total extirpation cures it. The patients usually do not come to us in time, or in the pre-cancerous stage, or when the disease is local, and if we would do anything for the relief of this disease we must see these patients early, and in order to do this it is necessary to educafe the laity as well as the patients themselves to consult doctors at as early a date as possible. This old-time idea that the menopause is a stormy period attended with frequent hemorrhage is something that must be gotten out of the mind of the public. The menopause is not a pathological condition unless attended with some pathological condition of the uterus and ovaries, and a woman should pass through that stage just as she does the beginning of it, with no more trouble in the discharge of this function, in the subsidence of this function, than in the beginning of it, provided you do not know of any pathology existing in the cervix, the uterus, the tubes, or ovaries, and the idea that a woman must have a certain amount of trouble at this time is one of the greatest factors in the large mortality in our operative procedures. If we wait until the patient comes to us with a stinking discharge, with hemorrhage and cachexia, the disease has undoubtedly passed beyond operative procedure, and no man is justified in subjecting these patients to an extremely radical operation after this has taken place. If we take a patient who has suspicious symptoms, a slight leucorrheal discharge, a slight hemorrhage on sexual intercourse, with pains, it prompts us to make a careful examination with a view to seeing what we can find. If we take a tenaculum, hook it into the cervix, make slight traction on it, if there is degeneration from malignancy, the tissues will tear very easily, particularly the tissues of the cervix. You can put any amount of traction upon the healthy cervix without inflicting any traumatism. A slight bleeding will follow from an inflammatory condition, but where excessive hemorrhage follows slight traumatism you may make up your mind that there is malignant disease present. This first symptom is a thing which leads us into the light and diminishes our mortality rate. It is in early diagnosis and the education of the public to recognize these symtoms as cancer and bring the patients to us early for operation that we must expect results. I do not believe in total extirpation by the combined method; it is far preferable to attempt vaginal hysterectomy or abdominal hysterectomy alone. Total extirpation can be simplified by beginning the operation as if you were going to do a vaginal hysterectomy, cutting the vaginal wall, stripping the bladder back, and making a circular incision around the cervix, securing the uterine arteries from below and opening above, and the uterus and cervix can be taken out very readily. If you begin from above and attempt the whole operation of panhysterectomy, you will find it is one of the most difficult procedures you can conceive of in connection with surgery."

Dr. E. M. Folkes, Biloxi, Miss.—"This paper of Dr. Payne's opens up a large field of thought as to whether the medical schools give the correct teaching to medical students. I think it is wrong for a surgical body to take it for granted that the average practitioner of medicine takes the trouble to examine these patients, or if he does examine them, to realize the conditions that exist. I believe Dr. Payne is absolutely correct in stating that a very large proportion of the widespread conditions due to cancer of the uterus are ascribable to the medical profession undoubtedly—that is, we do not take earlier steps toward their eradication. It is the business of every practitioner to impress upon all women the danger from a slight hemorrhage from the uterus. There are one or two points I would like to emphasize. I had a patient a short time ago who in May had for the first time in her life metrorrhagia; her menstrual flow had been perfectly normal up to that time. She was quite an intelligent woman, and knew what she was talking about. She had leucorrhea in May; she had a profuse uterine hemorrhage; she called in a physician in my town who had practiced medicine for twenty years; he never examined her, and let her alone until the next menstrual period, at which time she had quite a profuse flow, two or three times more than she ought to have had. He did not tell her what was the matter, and sent her to New Orleans, and a surgeon there found cancer existed and it had advanced to such an extent that nothing but a radical operation would do any good even at that time. That is one case. I had a case in my own personal experience of an unmarried woman, fifty-one years of age, who had quite a decided leucorrhea which became more or less sanguinolent, which lasted for a year or more, and that set up a condition of continuous hemorrhage. When she fell into

my hands I frankly told the people that I thought that she would die on the operating table, although she was entitled to the chance of an operation. I took the uterus out; there were no adhesions, and the woman nearly died on the table. Twenty-nine days after the operation the woman was sent home. Four years after the operation she felt fine and was doing all her house work. I do not think we ought to condemn them without giving them some chance which may be derived from an operative procedure, even though these women are practically dying by the time we get hold of them. But the profession should educate women as to the dangers from hemorrhage and from leucorrheal discharge which is tinged with blood, and should always make a careful examination. That is the real crux of the whole proposition."

Dr. Payne (closing the discussion).—"This discussion has brought out points which I hoped would be more freely discussed on account of the great number of women who are left alone. They do not know what the condition is when they come to us. They come to us seeking relief, we examine them, give them a little medicine, and let them go, and later on by the time they fall into the hands of right-thinking men their condition is beyond hope. In referenence to the combined operation, I think it is always a good idea, especially where there is a good deal of involvement around the cervix, to make the vaginal incision, anterior and posterior to the cervix in order that the operation may be facilitated as well as being sure that we remove all of the tissue that is involved. This should be done if there is the slightest encroachment on the vagina by the pathological process. I stated in my paper that I thought vaginal hysterectomy in these cases is not to be thought of because there are conditions which we cannot cope with as we would where we have the abdomen open and the conditions under our sight. I have recently seen two cases that impressed me very much. I was told about a month ago to come and see a negro woman who had pellagra. She had been treated by a physician for a year. I found her in a desperate state so far as the pellagra was concerned, but she also had cervical cancer that was in the last stages, and she died within two or three days afterwards. Not more than two weeks ago I was called to see a woman, forty-two years of age, who had been treated by an excellent physician for a year, off and on, and upon pulling down the cover I saw a very bloody discharge on the bed, made an examination, and found that woman had cervical cancer which had passed beyond the operative stage."

THE PATHOLOGY AND TREATMENT OF UNUNITED FRACTURES.*

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In every community it is an almost daily occurrence for babies to be born and for bones to be broken, and to the general practitioner the laity turns for succor and help amid these difficulties. This fact alone should make it mandatory for every man, doing a general work, to acquire and to hold to, the fundamental and basic principles which underly the treatment of all fractures, which, when summed up, means that he bring to bear on each case *common sense, judgment* and a *working, practical knowledge* of *anatomy* and of *mechanics.*

To illustrate: The man who would apply to a fractured olecranon process of the ulna a right angular splint, leaving a separation of one or more inches in the fragments, when a straight anterior splint would closely approximate them, might properly be judged as lacking in most, if not all, of the above mentioned requirements.

Or, again, he who would apply to all fractures of the forearm a splint, fixing it in a position which did not have a due regard for the location of the fracture, or fractures, and a careful consideration of the normal action of the pronator radi teres muscle upon the upper fragment, might well be pronounced careless and negligent of the anatomy of the parts involved.

For my own part, I am free to confess that I undertake other work of greater magnitude and greater responsibility with less timidity than I am wont to experience in the handling of a case of the usual run of fractures; and I have brought myself to believe that this lack of confidence is born of ignorance, and, as a consequence, during the past few years, I have

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come to study my fracture cases more closely and more carefully with the prime object in view of minimizing the deformity. Public criticism is frequently withheld when a surgical blunder is committed within the abdomen, but it is sharp and relentless when it is apparent in a limb. A man who dies after an operation is soon buried, and with him possibly our technical error, but the man who has a deformed arm or a shortened leg from a badly treated fracture lives on and on, a veritable ambulatory advertisement of our surgical limitations and of our palpable shortcomings.

For these reasons, then, it has seemed to me that a brief consideration of some of the factors which contribute to the faulty union of broken bones, as well as the treatment for such unhappy conditions, might be a subject not wholly inappropriate to present for discussion before this body upon this occasion.

In order to better understand the pathology of ununited fractures, let us pause for a moment to consider the reparative processes exercised by nature in the case of a simple fracture.

Bone is one of those tissues whose cicatrices are composed of a substance closely resembling, or identical with, the original tissue. On account of the solidity of bone, we are prone to view it as more inert than the soft tissues. Yet a moment's reflection should dispel this idea, for bone grows and shapes itself, when acted upon by the reparative forces of nature, quite as readily as do the softer structures. When a fracture takes place, the cylindrical shell is broken along an irregular line and probably always with the production of splinters of greater or less size. The periosteum is usually torn, though probably not so extensively as has been supposed. At the same time, blood is poured out from the torn vessels of the bone into the gap between the fragments and from the vessels of the soft parts. This blood is gradually absorbed during the first few days following the receipt of the injury. The periosteum becomes much thicker, softer and more vascular; a thin layer of gelatinous or viscid liquid is found between it and the bone for a distance of a few lines from the edge of the fracture. The portions of the periosteum which have been stripped off and the lacerated tissues which form the wall of the cavity in which the ends of the bone lie, granulate and pour out an exudate to mingle with the remaining blood. In this process the marrow also shares, and by this proliferation we have all the adjoining parts bound together in one firm, compact mass. The compact layer of bone, the cylindrical shell, also reacts in the same manner, but much more slowly.

Thus we see that there is a bond of union, which is actually continuous almost from the beginning, with all their constituent parts. The *size* and *character* of this bond vary with the *degree* of *displacement;* if the fragments remain nearly in their original relations, this bond is short and symmetrical, the granulations springing from the marrow meet and unite in the center of the gap, while the thickened periosteum passes from one fragment directly to the other. If, however, the apposition of the fragments is poor, and remains so, this bond is, of necessity, larger and passes more obliquely from one end to the other.

The formative action thus begun is rapidly carried on, principally by the periosteum and marrow, and we thus have formed the so-called provisional or *ensheathing* callus. This is at first formed of embryonal elements, but soon becomes cartilaginous in the portions formed by the periosteum; the lime salts are deposited and finally it is transformed into bone. The granulations which spring from the *marrow* ossify without passing through the cartilaginous stage, and the fine lamellae of bone thus formed constitute the *internal* or *medullary plug*. After the ossification of the callus has been completed the excess on the exterior slowly disappears, and in cases in which the reduction of the displacements has been exact, this disappearance may go so far

as to leave little or no trace on the surface of its previous existence.

When the fracture is *compound* and remains so, the details of the reparative process are different in that the callus does not pass through the *preliminary cartilaginous stage* at any point where suppuration has occurred. The formation of the *medullary* plug, however, is not affected, the granulations here being transformed directly into bone as they are in simple fractures; the difference, then, is in the external or ensheathing callus and is more exuberant callus formation, which is very prone to remain tender and sensitive for a long period of time.

slower and ofttimes a very much faultier and due to the destruction of the periosteum by the suppuration. We thus have a very much

Now, what occurs in the case of *delayed union, fibrous union,* or *failure of union,* or *pseudarthrosis?* It should be remembered that the final step, viz.: *ossification,* is often still possible even after a delay of many months, and that a case which deserves to be termed, clinically, as a *"failure of union,"* is yet identical, anatomically, with another in which ossification will follow without other aid that the prolongation of the usual immobilization. The term pseudarthrosis—literally, false joint—is not restricted to those rare cases in which some of the characteristics of a joint are really present, but is used as a synonym of failure of union. Further, in those cases where, from the first, bony union is unlikely, as in the patella, olecranon and some fractures of the neck of the femur, the term *fibrous* union is habitually used instead of failure of union.

Broadly stated, *delay in union is not infrequent,* while *failure* of union is *rare.* Failure is more frequent, actually and relatively, in the shaft of the humerus than in that of any other bone.

The chief causes of delayed union, or failure of union, are:

First and foremost, the failure on the part of the surgeon to properly reduce the severed fragments of bone so that they are brought into close and accurate alignment. I should here like to emphasize the fact that the great surgical principle underlying physiological repair of injured tissues everywhere within the body is of paramount importance in the healing of fractures if our ideal is to be achieved. That is to say, tissues of a given histological structure should be brought into direct contact with tissues of a similar nature, so that, when the reparative process is begun, the cells from one side, stretching out to meet those from the opposite side, may find suitable companions with which they may mix, mingle and fuse, and thus form a *homogeneous,* and not a *heterogeneous,* whole.

To be more specific: If in a given case of fracture of one of the long bones, the fragments have been properly adjusted, the marrow cavity of the one end will be exactly opposite the marrow cavity of the other, and the reparative processes springing from each can be used to the best advantage, as the cells will be of a similar histological structure; the same holds true of the granulations thrown out from the dense bone and also from the periosteum, the result being the uniting of similar cells and the construction of a *homogeneous* callus.

If, however, the approximation of the fragments is faulty, instead of the above orderly arrangement of the various cells, we get a general conglomeration, and the resultant is a *heterogeneous* callus.

It may prove interesting to note that, for the year of 1908, one of the largest liability accident insurance companies in this country showed that out of 100 suits for damages, 75 per cent. were brought on account of surgical conditions, and the remaining 25 per cent. on account of medical conditions. Of the damage suits brought against surgeons, 75 per cent. were on account of deformity following the treatment of a fracture. This fact forcibly illustrates how very exacting the public is, and that its attitude toward the surgeon is one

of almost compulsion as regards the restoration of a fractured limb.

Second, arrest of the reparative process in the granulation stage, ossification not taking place, and the bond between the fragments remaining fibrous; or,

Third, the wide separation of the fragments, or,

Fourth, to the interposition of a bundle of muscular tissue;

Fifth, to the insufficiency of the blood supply of one of the fragments; and,

Sixth, a variety of assumed systemic disorders, such as rickets, marasmus, syphilis, starvation and the various infectious diseases.

As a matter of fact—and it is an authenticated fact—failure of a fracture to undergo proper ossification is more apt to be observed in a vigorous, robust adult than in the debilitated or aged.

In this search for the cause or causes of the failure to secure osseous union, the X-ray has shed considerable and valuable light. It would seem that, next to wide separation of the fragments and the interposition of adjacent soft structures, a nerve paralysis often figures as a potent cause of nature's failure to repair a severed bone. In such cases the X-ray shows that nature has either failed to throw out a callus, or else there is an atrophy of the ends of the fragments. The size and character of the callus is a fairly accurate guide as to the extent of the initial injury; a slow-forming, poorly ossified callus indicates severe initial trauma, while a small homogeneous one would indicate a ready reparative response in the bone.

For clinical purposes, and for convenience in the consideration of the treatment, we may divide ununited fractures into those of *delayed* union, and those of *non-union;* yet it must be understood that we have at our command no positive way of differentiating between these two conditions except by the ultimate result in each individual case. Consequently, the surgeon—and properly so—when first encountering a case of ununited fracture, proceeds on the assumption that the case is one of *delayed union,* and makes, or should make, every effort to stimulate osseous union by the employment of such agencies as will improve the general condition of the patient as well as those directed to the stimulation of the reparative processes at the seat of fracture; such means being irritation of the fragments, the establishment of a more perfect coaptation of the fragments and the employment of Bier's method of producing artificial hyperemia. This last method will ofttimes materially aid in the ossification of the callus and should always be given a fair and thorough trial.

Furthermore, errors of digestion should be corrected; the kidneys should be carefully looked into, and the general system placed in the best possible condition. Owing to the ubiquitous nature of that wide-spread disease—syphilis—and its pronounced tendencies to make itself manifest in the best, as well as the worst, regulated of families, it is well, if an ununited fracture of less than a year's duration presents itself, to give a thorough trial, the iodides and mercury. Dr. Stuart McGuire, of Richmond, states that this is an invariable rule with him, even though no specific history can be obtained, and that many times he has been rewarded by the effort.

If, however, after a thorough and conscientious trial of these various methods of bringing about osseous union, failing in this, we are justified in viewing the case as one of *permanent non-union,* and recourse should be had to an open operation. In this our effort should be, in each case, to utilize an incision which will inflict the least damage to the soft structures, and yet one which will give a through exposure of the whole field. Absolute and rigid asepsis must be employed. As regards the material best suited for holding the fragments in position there is considerable diversity of opinion. Some operators prefer unabsorbable materials, such as silver wire or plates, while others are prone to condemn these and to strongly advocate tempo-

rary and absorbable material, such as kangaroo tendon and chromic catgut. In this connection it is well to remember that if a foreign body is left in a wound, the surgeon must be infinitely more careful as to asepsis than he is in the ordinary course of events; and, further, he must be careful in a degree proportionate to the bulk of the foreign body. I am persuaded that it is because of insufficient aseptic precautions and a lack of manual dexterity that we so frequently hear of "rarifying osteitis" and of "bone atrophy" following these efforts at bone repair.

Dr. Lane, of London, who is an ardent advocate of the open operation for the treatment of practically all fractures, whether open or closed, lays great stress on the observance of a most rigid aseptic technic. In his work, the edges of the wound are protected by several folds of gauze anchored by means of fenestrated forceps, the handles of which are of sufficient length to fall away from the wound; the forceps used to control hemorrhage are of such strength as to eliminate the necessity for applying ligatures; the hands, although gloved, are kept out of the incision as much as possible, in order to obviate a possible contamination through a puncture in the glove, and long powerful instruments are employed for manipulating the fragments. He prefers, when possible, to use long steel plates, carrying as many screws as space permits, the latter being of a length only sufficient to engage the proximal compact tissue and threaded up to the head in order to secure as firm a hold as possible on the bone.

In old fractures, with much callus formation, some trauma must, of necessity, ensue, yet every effort should be made to reduce this to a minimum. The capacity possessed by periosteum and bone to resent the insults of trauma and infection is not comparable to that of the peritoneum and therefore we should proceed, in these cases, with even greater caution and care than when operating in the abdominal cavity.

A want of time precludes the going into lengthy detail of many important facts which attach to this very interesting subject, yet I should like to say, in conclusion, that every physician who assumes the responsibility of treating a fractured limb, should recognize:

First, the gravity of every fracture—even the simplest.

Second, the prime importance of ascertaining, in the beginning, the exact nature and extent of any given fracture; bringing to his aid, when at all necessary, general anaesthesia and checking up always, when possible, the diagnosis by means of the X-ray.

Third, the necessity of a proper alignment of the bony fragments and the use of suitable appliances to retain them in position, if a good anatomical and functional result is to follow, and

Fourth, and lastly, the cultivation of the habit and the desire to correct and to hold corrected all fractures falling into his hands, and not to rely on "the forces of nature" to take the kinks out of a distorted limb, resulting from his own carelessness, his own ignorance and his own neglect.

THE ARTIFICIAL LEECH IN ACUTE MASTOIDITIS.*

By U. S. BIRD, M.D.,
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The application of the artificial leech, while a very minor operation, almost a therapeutic measure, assumes an important part in the treatment of acute mastoid troubles. My satisfactory experience with a limited number of cases is why I bring the matter before you. The living leech, of course, acts similarly but in a less degree. The difficulties attending their application are alone a sufficient reason for seeking a substitute. The technic of the use of the artificial leech is simple and easily carried out, but not unimportant. I use the Robertson leech, probably familiar to you all. I usually find it necessary to shave the hair sufficiently to give the necessary smooth surface for applying the vacuum chamber. I make as large an incision as the surface will permit, well down into the soft tissue; crucial if possible, T shaped otherwise. The flaps are loosened as freely as possible in every direction. The quantity of blood removed varies; from one to three ounces may be expected. A larger quantity would seem to insure a better result, but that has been uniformly good, without regard to the quantity. Bleeding rarely continues after removal of the leech because of the dense clot which is drawn into the wound by the exhaust pump. The scar is not noticeable after complete healing.

My experience includes some nine cases, the detailed records of which it is unnecessary to give. Clinically they were all instances of typical acute mastoid infection: Middle ear disease, temperature, mastoid swelling and pain. In every case the middle ear had been freely opened without relief. In all of the cases operation seemed probable, and in one case the patient was sent to a hospital for that purpose. In some, heat was used, but in most it was unnecessary after the leech. Calomel was given at first as a routine measure. An improvement was noted at varying intervals after leeching. At times it was immediate; it usually occurred the same day. In one case referred to the leech was applied in the morning with temporary relief. In the evening the patient was suffering so that he was sent to a hospital with instructions to prepare for operation next morning. Next morning he was feeling better; operation was postponed, and he recovered without further incident. In every case relief was permanent, no further active treatment being necessary.

The mechanism of the effects of local depletion are not clear to me. I have been unable to find any discussion of that phase of the subject. Authors describe the indications for, and the method and results of wet cupping, of which the artificial leech is a modification, but I can find no reference to explain how it acts. Dry cupping, modified and popularized by Bier, is classed by older writers as a counter irritant, which is not much of an explanation. No such attempt to work out the physiology of local depletion, as has been done in induced local hyperemia since Bier's work, has been made. As the facts are not at hand, a little theorizing may do no harm.

The result, which seems to be nothing less than a cure of the morbid process, can scarcely be explained by the removal of a small quantity of blood, one to three ounces. The same quantity removed from a distant vein would have no appreciable effect. The fact of its removal from organized tissue, and not direct from the circulatory system, may be a factor in the explanation. However, the loss of that quantity of blood from the mastoid region could have no great effect if automatic circulatory regulation would immediately re-

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adjust the local condition. That that is not done is evidenced by the result. The condition following the leeching is different, and remains different from what it was before. It is not unreasonable to assume that the local removal of a small quantity of blood by the artificial leech excites a nervous process which essentially modifies the morbid state. The removal of blood locally is just the reverse of what occurs in induced local hyperemia, in diseased conditions, and yet the object sought by each method is about the same. Bier's treatment, which is not applicable to mastoid diseases, is supposed to assist in the local increase of certain curative elements in the blood by increasing the local blood supply. Whether the curative results of local blood removal can be explained similarly: That is, assuming a local increase in curative elements in spite of blood removal, is a question. It may be that the local removal of blood releases certain curative tissue elements, or removes an inhibition on such elements, normally present; or may permit or stimulate the development of curative properties not previously present in cell or plasma or organized tissue. Some such assumption may explain an interesting and important phenomenon until more definite facts are at hand.

DISCUSSION.

Dr. E. C. Ellett, Memphis, Tenn.—"I was struck with the method Dr. Bird uses. It seems to me he applied the leech further back than I have applied it. For instance, I have never had to shave the hair to apply it where I applied it. It looks to me that the advantage he would derive would be to draw the blood more directly from the anterior mastoid process. As regards the action of these, certainly nobody who has used them can question their value in local conditions. It seems to me that in the amount of blood drawn you allow the dilated blood vessels to contract to a degree. When they recover their tone they resist the dilation. Another thing, the blood being stganated to a degree in these dilated vessels, the local abstraction of blood permits fresh blood to be brought in containing fresh curative elements. There is another matter that I suspect has probably impressed itself on all of us, and that is that the mastoid disease, as we see it in the South, is not as serious a trouble as it is in the East. Certainly they operate on a larger proportion of cases there than we do down here. It is no unusual thing to see an acute mastoiditis subside; and yet I do not think they have that experience around New York, for instance, and possibly such measures as the leech are more effective on the milder types, as we see down here.

Dr. J. T. Herron, Jackson, Tenn.—I did not understand, doctor, after using this leech, whether you use the ice or not. (Dr. Bird: 'Do not use ice.') I do not see the advantage of the leech over Wilde's incision. I have used the latter a good many times in former years, not in late years. I have had no experience with the artificial leech. I imagine it would be a good thing, especially using it before the ice. I would think to draw the blood from over the mastoid, and then use the ice afterwards would be advisable to follow in preventing trouble, much better than either one alone. Wilde's incision, of course, has been abandoned by most operators; most authorities have abandoned the incision. I have always used ice, and have always had good results, but I would not hesitate to use the leech and then the ice. Dr. Bird, where did you apply the leech? (Dr. Bird: 'Behind the ear.')."

Dr. J. P. Crawford, Nashville, Tenn.—As to the condition mentioned, the more frequent operations are in the East. I think unquestionably it is due to the fact that we in the South are more conservative in our work. For instance, we never operate until we feel that we have used every measure, artificial leech, hot applications, etc., to relieve the congestion, or involvement of the mastoid, and I believe in the East, I know in New York, especially, that whenever they get tenderness behind the ear, redness and some standing out of the ear, they go ahead with the operation at once. In Baltimore they are not so prone to operate. They are more conservative, as we are in the South. Now as to the artificial leech, I question very much the advantage in using it, although on two occasions I have used it. In one case I do not believe the leech did any good. In the other I think it did good. She unquestionably had pain, and this was relieved. She had excruciating pain, and there was nothing else to do. I suggested to the family physician to put leeches on. In that case the water leech was used. I got her three, and told her to let us know the next morning how she was. The next morning we had a telephone message that she was better, and she has been better ever since. I do not think the leeches did her any good, except to relieve her mind.

Dr. E. C. Ellett.—"Speaking of those operations in New York, Dr. Crawford, did you ever see the operation?"

Dr. J. P. Crawford.—"Never saw one. At the same time I question very much whether we have a middle ear inflammation or suppuration that we do not have involvement of the mastoid cells, or pus in the cells. I at least feel that some cases had pus in the mastoid that got well without an operation. Where there is a discharge from the ear, if you will open up, you will find pus in the cells. If you will not be in too big a hurry to operate, you will find that the case will get well without operation. If we will use those preventive measures, we can tell in two or three days, if we do not get an improvement. If you get a sagging of the posterior walls, and there is an increase in redness and swelling, then I think it is time to operate. I remember a case sent to St. Thomas Hospital, a woman in this city. Her friends insisted on an operation. Her

family physician sent her there for an operation. I said, give her a chance. I did give her a chance, and she went on to recovery without an operation. Of course sometimes I am disappointed that I do not get to operate, but I think we ought to give them a chance to get well without an operation.

Dr. M. Feingold, New Orleans, La.—"I would like to contribute a little to the topic mentioned by the doctor, and also to answer the question Dr. Ellett asked whether they do not operate in New York each and every time they find granulation or pus. The doctor answered correctly; you will find it in very acute cases, but that does not show that we should each and every time open the mastoid. To illustrate, I give the following case: A little boy had scarlet fever about six months ago. At the same time his ear began to run. It held out without any symptoms of mastoiditis. A specialist pronounced it mastoididitis. About six weeks afterwards the child developed paralysis of the left eye, then paralysis of the hand, and afterwards paralysis of the foot. The boy was taken to the specialist who had treated him, and he found the ear absolutely normal, but did not give the diagnosis of the neurologist. The neurologist insisted upon his diagnosis being correct. I was called in. I found in each eye a distinct choked disc. In consequence of this an operation was at once performed, not for mastoiditis, but for pus in the temporal lobe. The choked disc disappeared, the paralysis disappeared. Later on, about two weeks afterwards, the ear specialist reconsidered his diagnosis of mastoiditis, opened the mastoid, and all he found was a very few pus cells. I believe we might be a little too conservative in performing mastoid operation. Mastoid operation is absolutely harmless."

Dr. J. T. Herron.—"Dr. Crawford said we frequently have pus in the mastoid and it frequently disappears. I want to know how he knew he had pus without an operation."

Dr. J. P. Crawford.—"We must believe pathology. If we see indication of mastoid work, we must believe there is involvement of the mastoid. I do not think there is any question but what there is involvement if you have the ear standing out four ways for Sunday, with redness and tenderness behind the mastoid, and especially discharge from the ear. You must have pus there. You cannot have redness and other symptoms, without having inflammation of the mastoid cells."

Dr. G. E. Vaughan, Clarksville, Tenn.—"I see but very little use for the doctor's leech, if you wait until you have development of swelling and pain and all those symptoms. I believe with these symptoms the mastoid ought to be opened. We have waited too long, or at least long enough. I think Wilde's incision was abandoned, because after the incision was made it was found that the bone must be opened. I have never used the artificial leech, but it occurs to me that it has a very limited use."

Dr. U. S. Bird.—"In mastoid troubles, like every other trouble, there is no hard and fast rule to be applied to every case. Each case should be judged upon its own merits. We should operate on some cases, on others we should not. I think we should judge and decide on these things, as we would everything else."

THE HEATH MASTOID OPERATION.*

By M. M. CULLOM, M.D.,
Nashville, Tenn.

The operation for chronic suppuration of the ear, devised and practiced by Mr. Chas. J. Heath, of London, has aroused a great deal of interest in the past few years. This interest in part no doubt constitutes an arraignment of the radical mastoid operation. For if the radical operation had proven satisfactory in our hands we would not be so eagerly looking for a substitute. The fact that the radical operation as now practiced so often sacrifices the hearing and is by no means devoid of danger to life, would naturally make us investigate the claims of any method less dangerous.

The claims made for the Heath operation are the cure of chronic suppuration, the preservation and restoration of hearing, the negligible rate of mortality, less danger to the facial nerve and its wide range of applicability to suppurative conditions of the ear.

If these claims can be proven substantial the future of the Heath operation is assured and the passing of radical operation certain.

The premise on which Mr. Heath predicates his argument is the ability of the ear to take care of itself when provided with adequate drainage. He convicts the antrum of being the obstacle to drainage which nature is un-

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able to deal with. In fact, upon his argument that the antrum is the chief offender in chronic suppuration is based the whole theory of his operation.

He adduces some strong arguments in favor of this position. He calls the attention to the fact that the antrum is a bony cavity drained through a small unyielding bony passage. When swelling and granulation impede the already slender channel the drainage system becomes seriously embarrassed. For this reason he claims that the persistence of the aural discharge depends upon the antrum rather than the tympanum and becomes the key to the position. The antrum from its proximity to and liability to involve the most vital parts is called the danger zone of the disease. A little pressure long continued may expand it upward to the middle fossa, downwards and outwards to the mastoid process, or backwards and downwards to the lateral sinus. He has observed that erosion from the attic into the middle fossa is very rare in spite of the fact that the thickness of bone above the attic is less than that above the antrum. The reason assigned for this is interference with the drainage through the aditus. He claims that an antrum so infected can never recover through measures directed through the canal, and, furthermore, that the tympanum can never recover while it is the pathway of a foul discharge from the antrum. His theory is the elimination of the infected antrum. With the antrum out of the way and the tympanum relieved of its foul discharge, the tendency is for healing to follow promptly. In his first writings Mr. Heath was inclined to exclude cases of attic disease from those which he considered suitable for his operation, but latterly he has reported a number of cases of attic disease upon which he has operated successfully. While he does not claim that his operation entirely supplants the radical operation, I am inclined to think he would first subject any patient presented to him to his operation, since one of the claims he makes is that the operation can be readily converted into the radical operation if so desired. Having gotten Mr. Heath's hypothesis upon which he bases the theory of his operation, we will investigate its practical application. While the purpose of the radical operation is the saving of life, Mr. Heath has added to this the preservation and restoration of hearing. In order to accomplish this Mr. Heath's insistence upon one point is urgent, namely, that the cavity of the tympanum must not be touched. Therefore there is no removal of the ossicles, there is no curetting of the cavity. There must be not even the use of the probe for fear of displacing the incus. The perforation in the drum is carefully plugged with wet cotton to prevent the entrance of bone chips, as is the antral end of aditus also. These measures indicate the profound respect in which the middle ear cavity is held by Mr. Heath.

TECHNIQUE.

The only accurate description of the operation in print is the one by the honored chairman of this section, printed in the *Laryngoscope* for August, 1909. Mr. Heath's writings do not give the operation in detail and one would be at a loss in attempting to perform the operation from his descriptions. I take it that this is the reason that the description of the operation by Dr. W. L. Ballinger, printed in the Illinois *Medical Journal* for March, 1908, goes so wide of the mark. Dr. Ellett's description is absolutely true and one need have no fears in following it.

The preparation of the patient is the same as for the radical or simple operation. The incision differs materially. It begins in front of the ear just posterior to the temporal vessels, and follows the curve of the attachment of the auricle to a point opposite the upper edge of the meatus when it passes straight downward to the tip. The incision goes to the temporal fascia above and the periostium below. Mr. Heath gives a great deal of care to dissecting up the anterior flap, claiming that cosmetic effect is greatly enhanced by the proper attention to this detail. The flap is dissected up from the fascia and periosteum

to the meatus and the membranous canal is separated from the bony canal above and backwards. A feature of Mr. Heath's operation is a periosteal flap which is formed by a vertical incision along the posterior margin of the meatus. Two parallel horizontal cuts extend from each end of this cut to the line of the incision. The flap is dissected up and held out of the way by a special clamp. The antrum is then opened with mallet and gouge and the posterior canal wall taken down to within a quarter of an inch of the membrane. Enough of the floor is removed to make an even surface from the floor of the canal to the bone wound. Enough of the floor and of the superior wall is removed to give a clear view of the tympanum. A bridge of bone is left ¼ of an inch wide and ¼ deep as a protection to the facial nerve. The perforation in the drum is explored and granulations removed by means of special forceps. The perforation in the drum is enlarged if necessary or a fresh one made. Mr. Heath then uses a special canula to blow air and fluid through the antral end of the aditus for the purpose of cleansing and dislodging granulation tissue. A single meatus flap is cut by thrusting a special angular knife through the upper wall at its junction with the anterior wall. The knife is withdrawn and entered through the same incision from behind and the cut extended donward and outward to the floor. The cut is then extended from the first point of entry backward along the roof to the inner end of the membranous canal. The vertical incision is extended backward and upward to enlarge the canal. Any excess of tissue is dissected from the posterior surface of the flap to make it more adaptable. The periosteal flap is now turned down on the floor of the bone cavity and the meatal flap laid on this and the two united with a catgut suture. A tiny plug is placed in the antrum and another on the drum and a perforated rubber tube large enough to fill the meatus is placed in the ear extending to the bridge. The incision is closed by skin sutures and a wet dressing applied. The dressing and all sutures except the central one are removed the day following the operation. The cavity is cleansed and dried and the patient ordered to blow air through the ear by the Valsalva method. The canula is then placed in the aditus and the effect of a blast of air is noted. After seeing that the membrane is free from the liability of adhesion to any granulation, the cavity is swabbed with iodoform emulsion, the same tube is replaced and a dressing applied. The hearing is tested at this dressing and Mr. Heath claims that improvement is nearly always noted.

CONCLUSIONS.

The operation is safer than the radical operation. There is less danger of intra-cranial involvement following the operation. There is practically no danger of injuring the facial nerve. There is no injury to the hearing and the operation is often followed by marked improvement in hearing power. Suppuration diminishes rapidly and post-operative healing takes place sooner than after the radical operation. It can be easily converted into the radical operation if desired.

DISCUSSION.

Dr. H. H. Martin, Savannah, Ga.—"I have never had the pleasure of seeing the Heath operation done, and the description of the one Dr. Cullom refers to is the only one I have read prior to this one. It seems to me that there has been a long-felt want for just such an operation as this. An operation that has for its object the cure of suppuration in the middle ear. I was glad to hear Dr. Cullom use the expression, "profound respect for the middle ear," something I think we have lost. I fear we have all become a little regardless of ultimate results in hearing in using our probes. I have for some years tried to do my mastoid operations, following this same idea that Heath has brought out, but not so perfectly as he has done it. I have always made the quadrangular flap. I have also made it a rule to go directly into the antrum. I think Heath has given us a most valuable operation, and I think we will profit by it."

Dr. E. C. Ellett.—A brief report of some experience with this operation. I have had six of them. One of those I subsequently converted into a radical. The discharge did not cease and the odor continued, and I made it into a radical. One other case, the last one, a radical was done and it is still discharging. That was done a few weeks ago. In one case the hearing was not improved, but that was

the first case I did, and I think it was a badly selected case. It was a small child, and I was never able to make out how good her hearing was, except that she could not hear much. The other cases have been very satisfactory, in that the process was arrested, and the hearing preserved. I think even in the ordinary radical the Heath incision is superior to anything I have practiced heretofore. The early removal of the sutures is another good point I got from him, which is applicable to other operations. The operation might be said to be still on trial. I do not know whether it is on account of Heath's personality, but I think eevryone who comes in contact with him is favorably impressed with what he says."

Dr. M. M. Cullom.—"I noticed that the men in London made light of Heath's operation. I do not know whether to attribute that to local jealousy, or whether there is any real reason for it. I became very well acquainted with some men who worked in the clinic with Heath, and they rather claimed that his cases were cases that did not really call for mastoid operations at all. They claimed that many of them would have recovered without operation. I do not know whether this is true or not. It may be that there was a great deal of local prejudice, and that they were not giving him a fair chance. It has been tried a number of times in Chicago. Some men think well of it, and some do not. As Dr. Ellett says, the operation is still on trial. Many more operations are needed before we can clear our judgment as to the value of this operation.

THE OPERATIVE TREATMENT OF FRACTURES.*

By CARROLL W. ALLEN, M.D.

In the treatment of fractures the medical profession is divided into three camps; those who never operate under any conditions, or but very rarely; those who operate upon almost every case, the extremists; and the conservative middle-ground men, who operate only selected cases.

From the first camp we have nothing to learn except that their results are often bad, leaving the patient with a crippled, distorted or shortened limb, their cases furnishing most of the malpractice and damage suits that the profession is called upon to defend.

The extremists contend that few fractures can be properly reduced without an open incision. They were the first to undertake operative interference. While their views are extreme and we may not care to follow them in all things, they have taught us much. We have learned with what comparative ease these operations can be performed and their freedom from complicating after-results attributed to the operative interference, when properly performed as to time and technic.

The view of operating upon all fractures will, I doubt, ever become universally adopted; a more conservative middle grounds seems the wiser, and to this group most conservative surgeons belong.

We learn from the study of the after-condition of fractured limbs that a timely operation could have done much towards restoring or improving the functional usefulness of many of them.

Numerous such cases coming under my observation for late operation, seeking correction of their deformities, and a larger number seen shortly after injury, but who have already received the best efforts of the surgeon in an attempt to reduce and hold reduced the fractured fragments, but who when studied with the X-ray, show the conditions presented in the plates exhibited here, prove that this subject, in spite of all that has been said and written, is not yet receiving the attention it merits. And I am furthermore convinced that the proper treatment of fractures is one of the most difficult of problems that the surgeon is called upon to deal with and that their treatment and operative interference furnishes a rich field for careful and thorough work.

The X-ray in this work is of tremendous value and should always be used as a routine in the treatment of all fractures, except the

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simplest. Manipulation of the limb and its external appearance give but a poor and frequently erroneous idea of the condition of the bone.

A general anesthetic is demanded for the proper reduction of all fractures except the simplest.

All fractures after reduction should be subjected to the X-ray, and we often find that what was thought to be a well reduced fracture, proves to be far from satisfactory.

In many cases reduction is possible, but cannot be maintained owing to the obliquity of the line of fracture. When reduction is impossible, operation should unhesitatingly be performed, and we frequently find upon operating upon such cases that the interposition of soft tissues would have made reduction impossible by any other than operative means.

The skiagraphs illustrate some of these points. Some of these cases were supposed to have been properly reduced, but the surgeon was either mistaken or the bones had slipped later; in others reduction was clearly impossible, and the cases were referred for operation.

WHEN BEST TO OPERATE.

The time for operation calls for some judgment. In cases seen early, within the first twenty-four hours, when there is not much injury to the soft parts, operation had best be done at once. Where there is extensive injury to the soft parts, or where several days have elapsed before first seeing the case, delay should be advised until the local inflammation subsides, sometimes about the second week, when there will be less danger of infection. Dr. Matas, in his contribution to the discussion on fractures, read before the Louisiana State Society in 1901, in quoting from Stimson, cites the following:

"The risk of primary interference by operation is, I think, less the more promptly it follows upon the receipt of the injury. If it is done within the first twenty-four hours, the condition is then practically that of an operation upon previously uninjured tissues, and the same confidence may be felt that primary union will be obtained, but if the third or fourth day has been reached and the tissues are swollen and infiltrated with extravasated blood, the same confidence cannot be felt, and it is better to wait for the subsidence of the swelling and the absorption of the blood."

When delay in operating is necessary, and there is much overlapping of the fragments, evident from shortening of the limb and X-ray examination, extension should be applied to maintain the normal length of the limb until the operation is performed.

Regarding the technic of the operation, I will only speak of certain points which appear most important. There is a growing tendency to the use of plates, bands, screws and wire; all such material when unabsorbable and left permanently in the wound invariably gives rise to irritation and has to be removed sooner or later. Some cases may carry these foreign substances for years and then may return with a necrosis as a result. Such mechanical aids are highly valuable, but should be of absorbable material. If unabsorbable they should be removed after a few weeks, when they have served their purpose and union is well underway.

Often a strand of kangaroo tendon or heavy catgut if properly placed, through drill holes if necessary, serves to retain approximation until union has commenced. Occasionally when using silver wire I twist the ends and allow them to protrude through the skin wound, when after two or three weeks they can be easily taken out by using a little cocaine around the skin opening; the twist is unwound and one end cut off short and the remainder removed with a little traction.

In operating upon some fractures we can get a perfect approximation of the fractured ends, showing later by X-ray study that we have completely restored the normal contour of the bone, but in other cases where the ends of the bone are badly splintered and fragmented with necessary loss of the comminuted parts a perfect carpenter's joint can only be

obtained by extensive resection of the ends with consequent further loss of length; in such cases restoration of the length of the limb should receive first consideration and we should abandon the idea of obtaining a perfect carpenter's joint; the callous that is thrown out later will smooth over all irregularities. One of the skiagraphs I present is that of a compound comminuted fracture; the comminution caused a loss of about 3½ inches but by usnig a long spicule of bone and striking it into the medullary cavity we were able to bridge the gap and save what would have otherwise been a tremendous loss of length, which would have permanently disabled the limb; the patient is now using his leg with only ¼-inch shortening.

In fractures that come in late, after three or four weeks or longer, with several inches of overlapping, do not be in too big a hurry to resect the overlapping ends, but by firm and steady traction for one-half hour, or longer if necessary, combined with manipulation of the fragments and the division here and there of resisting fibrous tissue, you can frequently accomplish reduction without resection. Great care is necessary, however, in reducing such cases not to lacerate vessels or nerves that are caught in fibrous tissue.

Another plea I wish to make is that far too many limbs are needlessly amputated; with a little hard work and some ingenuity on the part of the surgeon many badly mangled limbs can be saved; as long as the blood supply is sufficient to keep alive the peripheral parts there is a chance. It is better that such cases spend six months in a hospital and walk out sound and able to make a living than to be discharged after three weeks with the loss of a limb and spend the rest of life as a hopeless cripple or a helpless charge upon the community.

THE OPERATIVE TREATMENT OF FRACTURE OF THE LONG BONES.*

By JERE L. CROOK, A.M., M.D.

Of all the injuries which require the aid of the surgeon, none is more frequent than fractures. The speed craze which is sweeping the world at present, on land and in the air, has vastly increased the number of appalling accidents, and broken bones are more often sustained than any other injury. In fact, the automobile industry has so enhanced the frequency of serious accidents in rural communities that the country doctor may be called on at any moment to attend people of prominence and wealth who have suffered dangerous injuries while touring along shady lanes in the country.

Fractures are peculiarly emergency cases, and their ultimate results are largely due to the kind of first aid they reecive. Many a doctor may never be called on to perform a laparatomy, but never a one, who is reasonably busy, has practiced a year in general practice without having a broken bone to set. Hence, while I might not hope to enlist the interest of all with the description of a difficult and rarely indicated operation, I am sure to awaken a response in the mind of every general surgeon when I speak on a subject in which all have had personal experience.

It is well always to remember that every patient with a broken bone is a potential plaintiff in a malpractice suit, and no more humiliating experience could befall a surgeon than to have some limping exponent of unsuccessful surgery hobble into court, lay down his crutches, and exhibit to a gaping, credulous jury a distorted leg, for which he holds the surgeon responsible. In nearly every instance

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of this kind the suit fails because of the proof of negligence on the part of the plaintiff and not lack of skill by the surgeon. Yet the experience is a harassing one, nevertheless.

While the dread of a malpractice suit is not the highest incentive to spur a surgeon to his duty, yet it is an intensely practical hint which I merely drop by the way, as malpractice suits are sufficiently frequent to be regarded as an important by-product of surgical practice.

Perhaps the most important contribution to the recent literature of fractures was the able presentation by Mr. W. A. Lane, of London, on their operative treatment, and the discussion which followed at the 1909 meeting of the American Medical Association at Atlantic City. The essayist advocated operation in all cases of fractured extremities as a routine practice. He showed X-ray photos of about 100 cases in which he had used steel plates and screws to fix the severed ends of the bone. The discussion which followed disagreed with the essayist as to operation in cases of simple fracture, but all agreed that nearly all cases of compound fracture should be operated where a favorable environment for the operation could be secured.

Without further preliminaries, I simply desire to report four recent cases of fracture of both tibia and fibula on which I have operated, in all of which I have secured good results, and in none of which could I have done so without operation.

Case 1. J. E., aged 70. This patient suffered a compound fracture of both tibia and fibula, just above the malleoli, as a result of a collision with a street car while driving in a wagon. He was thrown violently to the ground and the upper portion of the tibia was forced through the tissues and clothing and into the ground.

He was brought at once to my sanatorium, anesthetized and operated on. Wound was thoroughly opened, field of injury exposed, anterior tibial artery tied where it had been torn, blood clots and dirt removed, and the bones set and held together by No. 4 chromic catgut, uniting the periosteum, drainage inserted from top to bottom, and splints of binders board molded to the limb applied.

His recovery was very tedious and prolonged. The tibia underwent partial necrosis and required curetting twice, but he finally recovered and after a year is able to walk fairly well.

Case 2. D. D., Pinson, Tenn. While loading logs on a wagon the log chain caught his leg in the lower third and almost severed it. Both bones were broken, the anterior tibial artery torn, and all the muscles, except the gastrocnemius, cut in twain. This and the tissues behind it alone prevented the leg from being cut off.

This patient received similar treatment to the first case, except that in addition to ligating both ends of the artery, the muscles were sutured and the bones sutured with chromic catgut by drilling holes.

His recovery was likewise slow, but it was satisfactory, and less than eight months after the accident he was able to bear his entire weight on the toes of the injured foot.

Case 3. Alex M. (colored). Injured in a cyclone near Denmark. Brought to my sanatorium and examination revealed simple fracture of both tibia and fibula at middle of leg. Fractures reduced and leg placed in molded binders board splint, followed in six days with plaster of Paris cast. Removed at end of five weeks. No union. Reapplied, and removed four weeks later—still no union.

He was then subjected to operation, which revealed a piece of muscle between the ends of tibia, showing cause for non-union. Operation consisted of freshening both ends of bone and applying a steel plate, one inch wide and four inches long on top of bone, fixing it to each side with two steel screws. Tissues and skin were sutured over it, and limb placed in molded binders board splint. Primary union of skin occurred, and at the end of three months, under cocain anesthesia, the plate was easily removed by unscrewing screws, and the bone found to be united smoothly and firmly.

Case 4. R. S. C. Waylaid and shot down on street, two bullets passing through leg, cutting anterior tibial artery and breaking both bones, the tibia sustaining an oblique fracture near ankle. Patient hurried to the sanatorium and operated on immediately. A long incision over the tibia revealed thoroughly the conditions to be met. Both ends of artery were tied, debris removed, one muscle sutured and hole drilled through both ends of tibia where they overlapped; after trying silver wire and finding it ineffectual, the nurse was ordered to extract a six-penny nail from a box of freight recently delivered. She did so, and after sterilizing it by boiling, I drove it through the bone and found it held the ends securely. Tissues and skin were then sutured, and the molded binders board splint applied. He progressed rapidly and at the end of eight weeks union was good. The leg was then placed in plaster cast and he went to his home in Oklahoma. A recent report from him states that he has good use of his leg.

The discussion which followed the reading of Mr. Lane's paepr at Atlantic City last year was one of great interest, and was participated in by the leading surgeons on the subject of fractures in this country. Mr. Lane exhibited X-rays of one hundred or more cases on which he had operated, using the Lane plate or some form of mechanical device for holding the several ends of the bone together. These photographs were clear and showed the plates in every conceivable location. The most interesting ones were those with reference to the femur. He had used in some instances a heavy plate and large screws, and the apparatus is left in place for months without discomfort. Of course, where these plates are applied in a bone practically subcutaneous, like the tibia, it is a simple matter under local anesthesia to open the wound after recovery has occurred, and with a screw-driver remove the screws and lift out the plate. In using plates in bones deeply situated, as in the thigh, a general anesthetic would be required. The consensus of opinion as brought forth by this discussion was that the operative treatment of compound fractures was indicated in a great many instances, and was thoroughly practical, but that to advise operative intervention in simple fractures, where you get perfect adjustment under the skin without breaking it, was not to be advised; that surgeons had not arrived at the point where they could advocate that.

Speaking of compound fractures, where we can find a favorable environment for the operation, with the patient in good condition, we should in nearly every instance operate on a compound fracture, having in mind the ultimate results which we hope to secure, which are a good functional limb. As I stated in my preliminary remarks, the possibilities for deformity are so great that a malpractice suit is really a serious consideration and is one to be thought of.

I remember in my college days hearing the late Dr. W. T. Briggs lecture on fractures. He said that if he had a patient with a fracture of the thigh he would rather pay another doctor fifty dollars or one hundred dollars to take that case off of his hands than to treat the patient himself, because of the danger of shortening and deformity, and because the practitioner would frequently meet such a patient on the street. He related the case of an old negro upon whom he had operated that had five inches of shortening, and invariably, he said, when feeling good after some successful operation he had done and after a good dinner, he would drive along and see that old devil limping along the street, and apparently the limp was more exaggerated than it was before. (Laughter.) At the present time, with our present knowledge of how to secure an aseptic result in an operation with the various aids of obtaining that result, as afforded by the modern hospital, it seems to me we can take the position that the operative treatment of fractures of the long bones is indicated in every case. We know we have the opportunity, if the wound has been enlarged, of removing all debris, all dirt; we can then expose the entire field, and we can see exactly the condition present, whether or not there is overlapping of the fragments, whether there is loosening of the fragments; we can ligate the torn artery which is found in a serious fracture, we can remove all blood clots, we can restore the severed ends of the muscles, and also the nerves, if necessary, and get out of the wound, leaving it in a perfect condition for ultimate repair. With the use of posterior drainage, a stab wound through the back of the limb which can come out through the splint which is used, we do not have to disturb the leg at all until we have got practically union, that is, unless we have a great deal of secretion or unless there is some particular indication on account of elevation of temperature. Where everything progresses favorably we do not disturb the limb any more than if we had a simple fracture to deal with. In the modern treatment of fractures, particularly compound and comminuted fractures, the surgeons are coming to the point where they believe that operative treatment is the best treatment to be pursued, and without any further remarks I wish to report four recent cases that I have under observation at present of fractures of the leg in which I secured good functional results, and in none of which could this have been possible without operative treatment.

DISCUSSION.

Dr. W. P. McAdory, Birmingham, Ala.—"These papers have been very interesting to me, and especially two points, one brought out by Dr. Crook's paper and one by Dr. Allen. A number of years ago I had a negro man who was shot through the middle of the femur. I did not know that the bullet was lodged between the ends of the bone at the time I put the limb up in extension. I kept the limb in extension for five weeks, at which time I

took it down to find that I had an ununited fracture. I cannot exactly describe the feeling I had in finding the limb in that condition. I prepared him for operation, cut down on the seat of fracture, and found the bullet had flattened itself out, so that it made a considerable piece of metal about the size of one-quarter of a dollar, which was interposed between the ends of the bone. The bullet was a very large one. This was an extremely difficult case, the man was very large and muscular, and I had a very serious operation on my hands. However, after resecting both ends of the bone and wiring I succeeded in giving this man a useful limb. This operation was done four years ago. I was recently passing through the town in which he lived and saw him walking on the street with a perfect limb, but one that did not remind me of the experience which Dr. Briggs had by any means. In another case the man had been caught between the bumpers. He was a brakeman on a railroad, and the injury occurred on the 24th of last December. It was a very cold day; his right arm was caught in making the coupling, and I do not recall seeing such a bad compound fracture in my life as he had. The railroad surgeon did not advise anything but amputation. The patient was brought to the hospital that night, and at eleven o'clock I opened up the wound as well as I could—that is, I cleansed it, it had grease and dirt in it, and gave this man complete use of his arm. I speak of this case as one in which amputation was advised by the railroad surgeon.

Dr. H. A. Elkourie, Birmingham, Ala.—"In these cases of compound fracture it is important to cut down and wire the ends of the bone together or to fix them in some way, and we need to impress upon the general practitioner the usefulness of this procedure as well as the laity. It is far better to cut down on cases of compound fracture and do the work under personal inspection rather than trust to hypothetical diagnosis. I remember one case in particular where this was brought home to me very forcibly. A boy, eleven years of age, fell off of a tree, and the upper part of the femur struck a snag and produced a fracture. Although this happened many years ago, I brought the ends of the bone together, and put the limb in a plaster of Paris cast, yet at the expiration of five weeks the upper end of the bone protruded. I then advised operation. They called in the family physician, and after the boy was put under the influence of an anesthetic we walked into an adjoining room with the mother, and the family physician said the fracture could be adjusted all right without operation. No operation was done. Three months later the boy had six or eight inches of shortening, whereas if the procedure outlined by two doctors who saw the case previously had been carried out the boy might have had a useful limb. I want to make a plea for more thorough education of the general practitioner along this line, so that we may have the cooperation of medical men on this subject, and thereby correct every case of fracture. I would rather invariably cut down upon the bone and resort to fixation of the fragments than trust occasionally to hypothesis and meet with a bad result."

Dr. A. G. Payne, Greenville, Miss.—"I am sorry the first two papers in this symposium on fractures were not read. The impression that was created by Dr. Allen and others was that we want cooperation of the medical men. My opinion is that the surgeons all agree as to the best treatment of these cases of compound or comminuted fractures. One point to my mind of the greatest importance is that after examination by the X-ray, after you have reduced the fracture, and put on a permanent dressing, you should see if you have apposition. If you have not, you had better get it. So far as the treatment of compound fractures is concerned, to my mind there is only one method, and that is to operate thoroughly and at once. The main trouble in compound fractures, as you all know, is infection, and in all compound fractures it is best to operate, open up thoroughly, use carbolic acid, tincture of iodin, peroxide of hydrogen, bichloride of mercury, and everything else you want to use in order to be thoroughly sure that the wound is clean. In operating on compound fractures, of course, you have the wound open and the bone exposed, and any mechanical device you may see fit to use to hold the bone in apposition will work if you are clean about it. The treatment of simple fractures depends absolutely on whether or not you can get the bones in position so as to give the patient a useful limb afterwards without operating. You place the patient under an anesthetic, put on a permanent dressing, and if you have apposition of the fragments, there is no use to operate. If you cannot get and maintain perfect apposition you should cut down on the fragments and wire them, use a plate, a nail, or anything else you may wish to use to hold the bones in apposition. That is my idea of the treatment of fractures, both simple and compound, very tersely expressed. I could go on and report a number of cases. There is one point of great importance, and that is, where you have a simple, small spicule of bone, where you have the periosteum practically intact, you can remove large portions of the bone in between and get a good and useful limb. You all know that there is more destruction of bone, as a rule from a fracture, unless it is a crushing fracture, than there is from a pistol shot. I have seen as much as one-third to half of the humerus torn up by a number forty-four Colts bullet in a powerful negro, who weighed two hundred and eighty pounds, and he was crazy, and it was an utter impossibility to keep a permanent dressing on him. I finally said, 'Let him alone.' We took out the destroyed bone, he carried the limb in a sling, and in the course of a few months he had a good arm. It is very bad surgery to destroy the limb if it can be helped.

Dr. Michael Hoke, Atlanta, Ga.—"As an orthopedic surgeon it is my practice to correct many of the deformities which are the result of badly united fractures, and I want to speak a word in reference to the general practitioner, and I desire to say, that until an accurate work is written on the mechanics of the joints and on the mechanics of fractures, we cannot expect the general practitioner to treat these fractures successfully and get good results every time. There are many things in our books on fractures which are absolutely wrong. For instance, if a practitioner should put up a fractured elbow in the position of flexion and does not include the shoulder, he cannot control the upper fragment, the

shaft of the humerus. Similarly, if he has a fracture of the forearm to deal with, he cannot control the fragments unless he locks them by putting it straight. If he has a Colles' fracture, it is impossible to hold that except he has the other bone as a splint. The bad results in Colles' fracture are due to the fact that the position is not maintained by locking the elbow. It is impossible to control apposition of the fragments in a thigh by using a plaster-of Paris dressing, so that the question of mechanics and of getting the fragments in apposition is to be thought of. You can go ahead and carve up these joints that are badly deformed, if you wish, but I do not see why you should not in the beginning use your individual efforts and your mechanical conception towards getting the ends of the bone in place and holding them in place. If you do that, you do not have to operate on every case. My remarks have reference to simple, and not to compound, fractures. I have seen a good many cases of fractures in consultation in which a plaster dressing was used. The practitioners had used bought plaster which hardens quickly while applying it; the ends of the bone are not held in place. The patient is sent home, and the surgeon relieves himself of the responsibility of the after-dressing. The thing gets loose and the ends of the bone are not found in apposition. The main thing is to apply a dressing which will mechanically hold the fragments in apposition so that union or healing will take place. If you do that in ordinary fractures, you will not have to operate."

Dr. John Smyth, New Orleans, La.—"With reference to the qestion of operating on simple fractures, I think Dr. Allen has taken the proper position, namely, a middle ground. The doctor from Tennessee (Dr. Crook) I think resorted to the proper treatment in the cases he had to deal with, namely, he operated on them, which was the only means of success in that class of cases. I must differ with those gentlemen, however, who want to operate on every case. I think that would be a mistake. I have now under treatment the case of a young girl of a prominent family in New Orleans. She sustained a fracture of the humerus about an inch and a half above the elbow joint, supracondyloid, where the upper fragment goes backward and the lower fragment is tilted forward. These fractures were put in flexion, with a weight on the elbow joint after the suggestion of Lovett and Stimson. In this case we got, after repeated examinations, with the X-ray, as suggested, very good apposition of the fragments, and after eleven days the splint was taken off, the arm was massaged a little, and a light plaster of Paris splint reapplied. The girl will not only have a good functional result, but a good cosmetic result. If in a young girl of twelve years of age, who expects to wear short sleeves in six or seven years from now, an operation had been done, it would have left a scar, and she would never have forgiven me. If these cases can be treated sucessfully without operation, it is worth while to make the attempt. Another important thing in the treatment of simple fractures is that once callus has formed, in nine or ten days thereafter we can mould the callus before it becomes thoroughly set. If you have got apposition of the fragments, if you have angular or rotary deformity, you can correct it under X-ray examination. As to the question of foreign bodies where we operate on all cases, we must not forget that foreign bodies will cause, as Dr. Allen has mentioned, necrosis; a mild form of necrosis will result in all cases where the foreign bodies are in contact with bones, just as the injection of any sterile but irritating material, like the so-called tuberculous pus will not give pus at all, but it causes an irritation which results in the necrosis, with the so-called sterile pus as a result. We get these cases of necrosis with absorption, and a certain class in which the pus is sterile in character, non-virulent, but still it destroys the bone. These patients come back afterwards and insist on having the foreign body taken out. Again, we must remember that these foreign bodies produce simple pressure necrosis without any great inflammatory reaction. Again, you will find that these foreign bodies will cause a rarifying osteitis, which amounts to the same thing practically and clinically from the standpoint of the surgeon. As to the question of Lane's appliances, they are made of absorbable material—that is, the ablumin plate is absorbed in three months; still the screw must remain as a foreign body. I heard Mr. Lane sepak before the American Surgical Association the year before last, and heard this description, which was conclusive at the time, but in thinking over the matter and observing the cases we have had in our own clinics, I believe the position I have taken is the proper one, and in view of that fact, I am having my plates made, those known as the Lane plates, with collar to go round the bone—that is, two collars to go round each end of the plate. In these cases we use what is known as thirty-day chromic catgut. If you keep these plates in good apposition for thirty days, I supose callus will be sufficient to hold the bones in good apposition by that time. As to the use of such antiseptics as bichlorid of mercury or carbolic acid, as mentioned by one of the speakers, I want to take a little exception to that. We are dealing with aseptic surgery to-day, and not with antiseptic surgery, which goes many years back. It has been shown that a weak solution of bichlorid of mercury causes superficial zones of necrosis, which will result in death of the part, and consequently dead and dying tissue will favor the multiplication of germ growth. The immediate germs in that zone of necrosis may be gotten rid of by irrigation subsequently, but you have caused necrosis, and you have given these germs outside of the zone of necrosis an opportunity to invade healthy tissue or tissue which is not going to be healthy, but which will ultimately die underneath those zones which are not reached by antiseptics. You have brought about to a certain extent a devitalization of the tissue which has been already subjected to injury, and in that way you lessen its vitality and probably bring about or promote suppuration, which you would not do if you had not used irritating antiseptics."

Dr. Robert Caldwell, Nashville, Tenn.—"I am sorry I did not hear these papers on this subject, because the subject of fractures is certainly a very interesting and live one at this time, and I think possibly we have in this subject, as in all subjects, swung too far one way, while others have swung too far another way. I believe, however, that the operative treatment of fractures should be the rule, and the non-operative treatment should be the ex-

ception. I do not mean to carry that too far by saying that the non-operative treatment should be the exception. Perhaps I do not make myself very clear just there. I mean that a good deal depends upon the character of the fracture we have to deal with. If we have a transverse fracture, we know if we reduce it, it is comparatively easy to maintain it, and if we can demonstrate to our satisfaction that we have a transverse fracture of the bone, after it is reduced properly, it is fairly easily maintained, and we secure good results by non-operative treatment; but if we have an oblique fracture, a spiral fracture, and fractures of that character, it is difficult to maintain reduction, although we secure the fragments, it is difficult to maintain them in position. Consequently, knowing the comparative rarity of a true transverse fracture, we would say that the operative treatment in fractures should be the rule, and the non-operative treatment the exception. I believe we are coming to this. We are arriving at that point just as we did a few years ago arrive at the stage where we considered all appendicitis cases surgical, but we thought there was a certain number of cases of appendicitis that were medical. There are to-day exceptions to the rule, but the rule is they are surgical cases, and the exception is they are medical cases. As an illustration, I venture to say that the gentlemen here will agree with me when I remark that ninety per cent of the cases of appendicitis will recover from any given attack, but there is very apt to be a recurrence of these attacks. Then, if we say this is always a surgical condition, I believe there is a greater number of bad results from non-operative treatment than there are from operation on cases of appendicitis. So I think the day is coming when we will make the operative treatment of fractures the rule, instead of the exception. I see no real objection except in a few isolated cases, such as Dr. Smyth spoke of in the young woman, where the bones are superficial, and we can determine accurately the pathology we have as well as the reduction. Let us take fractures of the thigh through the deep muscles. There it is difficult through the muscle to reduce the fractures and then to maintain them. One other point with reference to plaster of Paris in the treatment of fractures. I believe plaster of Paris in the treatment of fractures should be absolutely relegated. I do not believe we ought to use it. We are not justified in using it in the old way. If we make a splint of plaster of Paris it is all right, but the circular plaster of Paris should be relegated. We should not do anything with it in closed fractures, because it is a fixed dressing, and you cannot control it, and you lose your reduction."

Dr. A. B. Cooke, Nashville, Tenn.—"I have been particularly interested in this subject. Personally, I am glad to agree with the last speaker in the treatment of fractures, particularly in those rare cases in which a scar or deformity may prove to be unnecessary and which may result from operative intervention, for the reason that if under aseptic precautions the open treatment of fracture cases is practiced regularly, as a routine measure, the question before us is, What possible harm can that do to the patient? It seems to me that is the main question to decide. If it cannot result in harm to the patient, if properly practiced, we cannot conceive it would do anything but good for the patient, because it would mean that in every individual case upon which this method was practiced, there would be an element of certainty as to the future outcome that is important to us and to the individual welfare of the patient. I was particularly interested in the remarks that were made concerning Mr. Lane, for the reason I had the opportunity a year ago last summer of seeing this gentleman operate on fractures by the open method at Guy's Hospital. He has as beautiful a surgical technic as I have seen in any field for any class of cases. He allows nothing to touch the wound that is not absolutely sterile. His assistants in the operating room are as aseptically prepared as they would be for an abdominal section in a clean case. Mr. Lane and his assistants wear rubber gloves, and so particular is he in regard to technic that he does not allow the gloved finger to come in contact with tissues of any kind. All swabbing is done by aseptic forceps. In that way he avoids contamination from the outside. He seems to be the leading advocate of open surgery in the treatment of fractures, and his results are incomparably superior to those of the men who only occasionally resort to this method. I do not see how there can be any possibility of injury being done by practicing the open method, and if practiced in the modern way, nothing but good can come from it. I do not see where the criticism comes in of practicing the operative treatment as a routine measure where the case is one of compound fracture. In those rare cases where deformity is likely to result, the deformity might be obviated by the more simple method, as in fracture of the clavicle. I simply wish to call attention to that one thought, that the patient is to be benefited and not to be injured, by the open treatment."

Dr. Crook.—"What does Mr. Lane do in a case in which the extremities are badly mangled and there is a good deal of debris; how does he secure an aseptic result?"

Dr. Cooke.—"I did not see him operate on one of those cases."

Dr. Eve.—"They sue him for malpractice." (Laughter.)

Dr. Cooke.—"Mr. Lane is a man who has not been sued for malpractice, but laying aside the question of malpractice, my remarks have been addressed to the bad cases of compound fractures, the ones that are likely to result disastrously in the hands of any man. The plea I wish to make is that we use our utmost endeavors to obtain uniformly good results, while we are not doing any harm by the open operative treatment."

Dr. Duncan Eve, Nashville, Tenn.—Asked to continue the discussion, he said: "I did not have the pleasure of hearing these papers, and I am very sorry that I did not reach the hall earlier. I take it, however, from the drift of the discussion, that we are speaking or discussing the open versus the ordinary plan of treatment of fractures, and I heard enough from the gentleman who has just taken his seat, and from my friend, Dr. Caldwell, to ire me just a little bit. Now, I want to state, gentlemen, that until recently we were very well satisfied with firm union. We did not think much about the question of permanent results. But since our ideal has been raised by the X-ray, we now not only insist upon functional results, but cosmetic ones, as well. I am afraid the X-ray has raised our standard

a little too high. It has probably raised it high enough for the purpose of the introduction, as Dr. Caldwell has proposed to make it, of the open operation being the general plan of treatment, and the ordinary, old-fashioned treatment our forefathers adopted, and as many of us adopt now, is only an occasional method of practice. The fact is that this whole matter began as the result of this gentleman whose name has been mentioned here to-day, Mr. W. Arbuthnot Lane, of London, England. He proposed this method for four distinct conditions, believing that the operative plan of treatment is the best and the proper plan in all simple fractures or single fractures. First, he proposed that the open method be resorted to to relieve pain from the movement of the fragments. He claimed that this could not be done so satisfactorily under any of the old plans, or the relegated splint, as he put it, was an ancient or perhaps disgraceful method of practicing surgery, and claiming further that all surgery now should be operative in reference to fracture. I believe he made that statement at the Philadelphia meeting of the American Surgical Association, and I want to show you how radical this gentleman is. He, at that meeting, you may remember, was invited by the American Surgical Association to read a paper on chronic intestinal stasis. Most of us would understand this to mean constipation, and he proposed to make a division of the ileum just above the ileocecal valve for the relief of that constipation, and this condition could be controlled by resecting a portion of the large intestine. Such is the radicalism that this gentleman proposed to practice for the relief of that condition. My God, what will he do with a fracture? (Laughter.) That is the position that gentleman took, and I want to say to you that there are surgeons in this room who will bear me out as having heard him make that statement. There is another member of the American Surgical Association present who will tell you that this gentleman was ridiculed for his extreme views on this subject. Mr. Lane's first position was that the operative treatment of fractures always controlled the fragments, and prevented pain. If you reduced the fracture and made the proper mechanical appliance when it was reduced, you would not have painful fragments. His second position was that it shortened the time or duration of the treatment, and under the circumstances the individual returned to his mechanics, as he called it, in a very much safer and better cosmetic condition. That may be true, but suppose we have infection. Let us suppose we have infection that has occurred recently with Mr. Lane, with all his extreme nicety of technic, because there is no cock-sure surgery. With the omission of some little detail on part of the nurse or somebody else infection may occur, and particularly in such a class of cases as Dr. Crook has suggested where grease and dirt are ground into the tissues, and it is impossible to render the parts aseptic. Surely, we will have infection in such a case. Suppose, instead of using kangaroo tendon or thirty-day catgut, he uses one of his plates, that has to be removed, and the question of shortening the duration of the treatment as compared with the old plan is not worthy of any consideration. In the third place, he claims it lessens the amount of extravasation into the tissues. That perhaps, in a measure, is true. While I am criticising Mr. Lane and others who have taken an extreme position in regard to the operative treatment of fractures, I do not wish to be understood as opposing the operative plan of treatment, because I believe it is the plan of treatment in certain fractures, but I am not modern enough yet to suggest that all closed fractures should be treated by the open method. In compound fractures this method of treatment is all right, because you have got an open wound. This method of treatment is all right for those fractures you cannot reduce, or when reduced, will not remain reduced or in coaptation. The experienced surgeons of this country, who discussed that paper which was read by Mr. Lane, men like Ochsner, Murphy, Scudder, Stimson, and others took the position that the time had not arrived, and it would not arrive, when we would accept the open method as an everyday plan for the treatment of closed fractures. It is a question of great skill and sound judgment to show that some fractures are best treated by the open method. Certain fractures of the elbow or of the patella may call for the operative plan of treatment. There are several good plans of treatment for a simple fracture of the patella without resorting to the operative treatment. I am willing to suggest that a fracture of the upper third of the ulna, where the upper fragment is thrown forward and cannot be controlled, and you must bring the lower fragment in contact with it, might be treated by the open plan. I would suggest, again, that a fracture in the upper third of the femur, which cannot be controlled, on account of the action of the psoas and iliacus muscles, should be treated in the majority of cases by the open method; also certain fractures of the upper half of the tibia, where the extremities are obliquely fractured, and there is no shoulder to hold the fragments in coaptation when brought together, may be treated by the open method. Perhaps the open method is the only plan to adopt in these cases, and even in some fractures of the os calcis or of the elbow joint that cannot be treated otherwise than by the open method or operative procedure. But to suggest that the ordinary fracture, or Colles' fracture, which is one of the most frequent we have to deal with, or fracture of the collar bone, which is a frequent fracture and rarely ever compound, should be treated by the open method, it is altogether too radical. Who cares for deformity, except perhaps some young girl? If she wants her case treated with the best cosmetic result, then, of course, we can cut down and wire the fragments, or adopt the laxation plan, put a bag of shot on it, place it in proper position, and obtain a satisfactory functional result, to say nothing of the question of deformity in the least. What patient would ask for an operation in a simple Colles' fracture, when it can be reduced so easily and treated so satisfactorily, as was pointed out by Dr. Murphy yesterday? What patient, with an ordinary simple fracture of the forearm, or an ordinary fracture of the humerus, would ask for the open method of treatment? From what Dr. Caldwell said, I inferred that he believes in operating on simple transverse fractures, but I do not think any of you have found many of them, and I hope you will not."

Dr. E. Denegre Martin, New Orleans.—"I belong to all of the three classes that have been mentioned. In the last ten years my attention has been called to the fact that nearly all of this fracture work in our

hospitals, not only in the Charity Hospital of New Orleans, but in the hospitals all over the country, has been very much neglected. This is not only true of the treatment of fractures, but true with regard to the teaching of the treatment of fractures to a great extent in many of our medical schools. Students have been simply taught that if a case of fracture comes in, all you have to do is to reduce it, put it up in a splint, and you will get apposition, and a result. To-day there is a tendency, according to our modern teaching, of giving the impression that when you have a fracture you must operate on it. That is wrong. When it comes to the question of treatment of fractures the first and most important thing is to know the character of the fracture, and above all, the anatomical structures involved. If you have a simple transverse fracture, you are a poor surgeon if you cannot reduce it and hold it in position. If you have an oblique fracture which is due to torsion, you know you are dealing with contraction of certain muscles, and you will have trouble in holding the fragment or fragments in apposition, and you must overcome the action of these muscles, if possible, if you would get a good result. If you have a compound fracture, you will not get union, and that is not all; you must know whether you are dealing with a constitutional condition which may prevent ossification; then, also, you will probably not get a result. That is true so far as the diagnosis or prognosis is concerned, but the worst feature is the application of splints. I was very much surprised to hear one of the gentlemen say that he did not believe in plaster. I should say he does not know how to use it. That is the only answer I can give, as I have seen it used thousands of times. Our orthopedic surgeons know how to use plaster, but the average surgeon cannot tell good plaster from bought plaster. Have you ever seen a practitioner fix a splint to a bone? Most men, who put on a splint in a case of fracture of the bone of the leg, do not include the knee-joint. He puts it between two sand bags, and what does he do? He anchors the man to the foot instead of anchoring the foot to the man, and every time the man moves in bed contraction takes place, and the leg is moving at the seat of fracture, and at the end of six weeks the practitioner finds he has an ununited fracture. What is the law of getting good replacement and of getting good fixation? You cannot fix a fracture to a splint unless the splint is fixed first, and that must be fixed at two certain points. In a fracture of the leg the ankle and knee must be included. When that is done, and you have got replacement, and you have no fracture next to the splint, you have a perfect condition. What is the best splint? The best splint is plaster, and why? Because you can mould it exactly to the contour of the leg, and when it sets you have a fixation bandage that is comfortable, that does not obstruct the circulation, that does not cause decubitus, and you can expect a result. The old method of using a circular bandage I think sometimes is a mistake. The best splint to make for primary use is a plaster splint, which may be made of repeated layers of plaster used backwards and forwards, and put upon the limb and held in place. You can fix it any way you want. That is the splint we are using to-day. We make all our splints. We use the ordinary plaster as sold by Johnson & Johnson, or that which we manufacture ourselves. If these points are carried out, there will be no trouble in getting good results. When a case of fracture comes to us we take an X-ray picture. We want to see exactly what the condition is. Under an anesthetic we reduce these fractures, and after we get the fragments in good apposition, we take an X-ray picture after the reduction, and when we find we have the bones in fair apposition and they remain there, we are perfectly satisfied with the results. We get better results. If we find in certain fractures we have failed to get apposition, that we still have some separation of the bone, or that we have a spicule of bone in close proximity to a vessel, which is the source of constant pain to the patient, we know that fracture has not been properly reduced. If a fracture has not been properly reduced, it must cause more or less pain to the patient. If we find these conditions, we do not hesitate to operate, and I want to say right here, the operative treatment of fractures is the most difficult surgery we have to undertake to-day, and no beginner has any business to attempt it. There is no surgery that calls for more careful, painstaking, and quicker work, and it is absolutely mechanical work. Let us consider some of the conditions. Some favor wire, some staples, some absorbable gut. If you have to cut down on a fracture to replace the fragments, what you want to do is to put the fragments in as near apposition as possible, and hold them there, and the man who uses any absorbable material makes a mistake. Those who use silver wire or kangaroo tendon before applying the splint have had the experience of an assistant letting it slip, and the work was undone. If you operate, be sure your operation is a success, and I can say I have never brought the bones together without putting an ordinary bandage on before sending the patient back to the ward. I apply fixation because I believe it is safer. Most of you will use that method of fixation which will hold the fragments in apposition the best in your experience. The whole question of the treatment of a fracture resolves itself into knowing your anatomy, studying the fracture, and doing what is best for your patients. I have operated on a great many simple fractures because I found I could not bring about reduction otherwise. After I have tried my best in a case of Pott's fracture to reduce it, and could not do so, I have operated and obtained a beautiful result. I never go into a case of simple fracture without fear of trouble. We want to impress upon the general practitioner and students that the treatment of fractures is not simple, and that they cannot treat them successfully unless they know something of the anatomy of the parts they have to deal with."

Dr. Crook (closing the discussion on his part).—"The hope of the secretary has been realized in having suggested this subject for discussion to several of his friends, and he feels very grateful for the free discussion which this subject on the treatment of fractures has received. I feel that we have come out of this discussion, all of us who have heard it, with more fixed and more clarified ideas as to our attitude in the future, and I think this subject is always one of supreme importance to any body of general surgeons, because all of the men present will have these cases occur in their practice, and every single man is interested in this subject. I think we should emphasize two or three points

that have been brought out. In the first place, as Dr. Eve has well shown, Mr. Lane's views were not shared by any great number of American surgeons when he made his radical statement at Atlantic City, New Jersey, during a meeting of the American Medical Association. At that time, he stated that every single case of fracture should be subjected to operation. Dr. Murphy, Dr. Stimson, and Dr. Ochsner disagreed with that recommendation, and as an outcome of that discussion the fact stands out very clearly and prominently with regard to the indications for the operative treatment of fractures, that if you cannot bring the ends of the bone in apposition and hope for a good functional result, you operate, provided you can have a favorable environment. If you can reduce a simple fracture and maintain it with the proper application of a splint which does not jeopardize the tissues, then there is no need perhaps of subjecting the patient to an operation. But do not jeopardize the reputation of surgery by waiting and waiting and then rushing in sometimes where angels fear to tread. As I stated in my paper, in the class of cases I dealt with he had a different state of affairs. We had already a wound of entrance in which there were septic products, and we did not add anything in the nature of gravity to the case by opening up that wound, and with proper care and doing the work under antiseptic and aseptic precautions we can remove the septic products and hope for a good result. We can clean out blood clots, wash out the dirt, put the fractured bones in apposition, and maintain them there by some form of mechanical apparatus, if necessary, but that will depend upon the ingenuity of the surgeon in the particular case. It is far better afterwards to take the apparatus out for fear there may be a time when the patient will have trouble and ascribe it to you, always remembering that every single case of fracture of a bone is a wonderful potentiality in the line of malpractice suits, and that these suits are more frequently the outcome of distorted limbs than anything else with which we have to do in surgery, and the injury is visible and tangible and constantly reminds the patient that he has this injury, and it can be shown to a jury. It can be X-rayed, and the surgeon apparently has no defense. We certainly should not advocate in this section of the Southern Medical Association any such radical ideas as have been proposed by Mr. Lane in regard to the treatment of simple fractures. In the first place, it is bad policy to advocate the operative treatment of fractures because so many men I think have these cases occur in their practice who are not fit to do a proper operation."

Dr. Allen (closing the discussion).—"I am glad that our papers on fractures stirred up so much interest and enthusiasm. After all that has been said, I think we are very much in harmony in our ideas. I am sorry Dr. Eve was not here to listen to the papers, as he would have found the consensus of what he said was quite in accord with the body of our papers. Some points brought out are very useful. Reference was made to the use of antiseptics, and Dr. Smyth replied to that phase of the subject very well, so it is hardly necessary for me to discuss it further. With reference to cleaning a compound badly lacerated fracture, the best method to adopt is, when a man comes in from a mill or mine, or has had a car run over him, and the limb is badly mangled, full of black oil, grease, etc., to pack the wound, shave all around it, remove the black oil with turpentine, following that with ether and soap suds, and getting the turpentine off, then using plain water, washing the wound out with nothing but water and drainage. Do not put antiseptics in a wound of this character. They are of no advantage. That, in brief, is the best method of handling these wounds. Pack the wound first well, clean the periphery so as not to wash more dirt into it; make counter openings, if necessary.

The splinting of joints is a very important point, and it is absolutely necessary in the treatment of all fractures. You should splint a joint both above and below the seat of fracture. You do not immobilize it unless you do. If you have a fracture of the shaft you must immobilize both the joints above and below. The X-ray is sometimes misinterpreted, and its findings should not be taken as a criterion of whether the work has been well done or not. What we strive for is a good functional result, and not perfect anatomical restoration. Of course, if you can avoid angularities or deformities, you offer no excuse for malpractice suits, as these suits are often brought when fractures are first treated."

RADICAL CURE OF PAINFUL HALUX VALGUS (BUNION).*

By H. P. COLE, M.D.,
Mobile, Ala.

Halux valgus is essentially a disease of civilization, usually occurring in feet where the great toe is from one-fourth to one-half inch longer than the second toe. Women are more frequently affected than men.

The normal axis of the great toe at birth and in the barefooted races passes through the center of the heel. In true halux valgus the axis of the great toe deviates outward from thirty to forty degrees, in extreme cases as much as ninety degrees. This outward deviation results from the fore-shortening of the foot incident to the wearing of shoes too short for the length of the foot. The promi-

*Read before the Clarke County Medical Society, March 29, 1911.

LEGEND 1. RADIOGRAPH. HALUX VALGUS BEFORE OPERATION. NOTE MARKED ANGULATION BETWEEN FIRST METATARSUS AND PHALANX. NOTE LARGE HEAD OF FIRST METATARSUS.

LEGEND 2. RADIOGRAPH SIX MONTHS AFTER OPERATION. NOTE THAT ARTICULATING HEAD OF EACH METATARSUS HAS BEEN REMOVED. NOTE THE PRACTICALLY NORMAL ANGULATION AND THE PRESERVATION OF THE JOINT.

nent tip of the great toe receives the end pressure and points outward to accommodate the foot to the shoe. This angulation is increased by the pulley-like action of the extensor proprius hallicis muscle, the tendon of which is early displaced to the outer side of the joint area.

Prolonged pressure of the shoe upon the prominent inner aspect of the first metatarso phalangeal articulation results in true bunion formation. Later a periostitis usually ensues with boney exostosis on the inner surface of the first metatarsus. At this stage of the deformity the patients suffer excruciating pain upon walking—this is frequently paroxysmal even after all pressure has been removed.

Persistent cases unrelieved by various types of so-called "bunion shoes" and other orthopedic appliances obtain relief only by operative measures.

Among the various radical methods of note we may mention:

First. Simple resection of the inner projecting surface of the first metatarsus.

Second. Resection of the proximal end of the first phalanx, together with removal of a wedge-shaped section of the distal and of the first metatarsus, just behind the articulating head. (Reverdin.)

Third. Resection of the metatarso-phalangeal articulation, removal of articulating surface from metatarsus and the first phalanx. Removal of exostosis. (Keller.)

Fourth. Osteotomy through the first metatarsal bone just posterior to the head. (Young.)

Fifth. Resection of the articulating head of the metatarsus through an incision between the great and second toes.

Sixth. Resection of the head of the first metatarsus, removal of exostosis. Restoration of joint by inserting flap of synovial tissue between stump of metatarsus and base of first phalanx.

The following case report will illustrate the simplicity of the last operative measure (6) and will demonstrate the results in severe cases. This procedure requires but a few days in bed and offers permanent relief to all cases.

Case Report.—Mrs. S., age 39, white. Past history unimportant, except that in capacity of nurse has had occasion to walk a great deal for years.

Present illness—For the past fifteen years has complained of bunion formation on either foot. For several years this has almost incapacitated patient as a nurse, due to the excruciating and paroxysmal pains suffered after prolonged standing or walking. Patient has tried many types of bunion shoes, large shoes, long shoes, plates and the like, all without beneficial effect. For the past three weeks patient has been practically confined to the house, paroxysmal pains of both feet ensuing the slightest pressure upon the metatarso-phalangeal articulation.

Physical examination—Negative, except in reference to "present illness." The great toe is deflected outward to an angle of forty degrees. There is typical bunion formation over both metatarso-phalangeal articulations. Redness, fluctuation and intense pain on pressure indicate a local periostitis or bursitis.

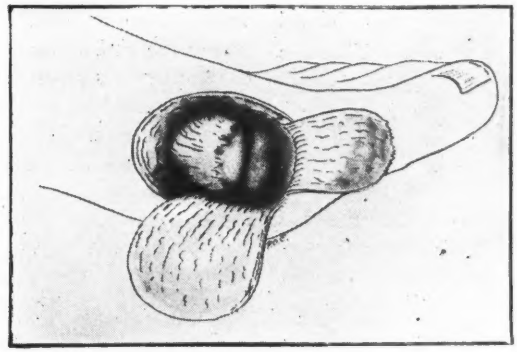
Radiograph (Plate 1) substantiates examination. No exostoses.

OPERATION.

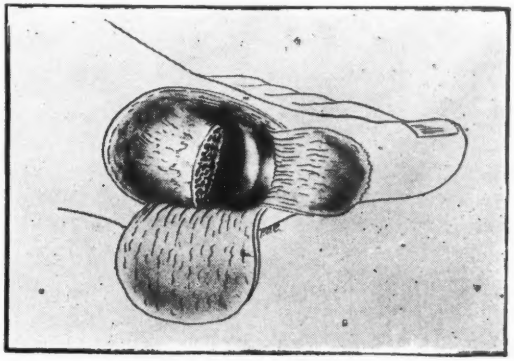
After the method recently described by Dr. Charles Mayo, a semi-circular flap was made of each bunion area with pedicle downward. Beneath this a flap of fat was reflected from the outer side of the head of first metatarsus, pedicle toward phalanx, the under surface of this flap consisting of synovial membrane from the metatarso-phalangeal articulation. (See Drawing No. 1.)

The large head of the first metatarsus was then resected in each foot, the edges smoothed and all particles of loose bone removed from wound. (See Drawing No. 2.)

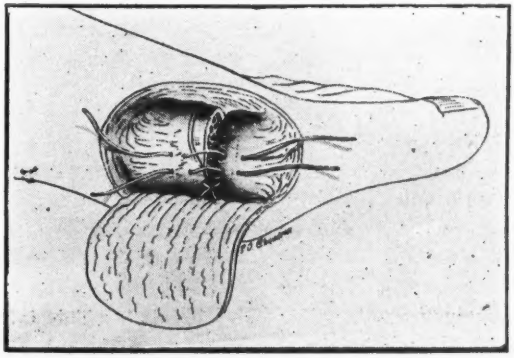
The fatty flap was then tucked between the stump of the metatarsus and the proximal end of the first phalanx, thus placing the inner



Legend 1. After the method described by Mayo, a large semi-circular incision has been made about the bunion, a fatty flap has been turned back from over the articulation, the synovial membrane lines the flap.



Legend 2. The articulating head of the first metatarsus has been removed after opening the joint cavity.



Legend 3. The fatty flap with the synovial surface intact has been tucked in between the head of the phalanx and the shaft of the first metatarsus. This provides two synovial surfaces in contact, preserving joint action.

surface (synovial) against the synovial lined articulating surface of the phalanx. This was stitched in place to preserve an articulating joint lined by synovial membrane. (See Drawing No. 3.)

The outer flap of thickened skin was next sutured in place with a small rubber tissue drain inserted.

The wounds healed readily and the patient walked with comfort in ten days. Within a month the patient walked with entire absence of pain and has remained free of halux valgus ever since. There is free joint action at metatarso-phalangeal articulation.

Radiograph taken six months after operation shows a practically normal foot minus the large heads of the first metatarsals. Articulation preserved.

No. 202 Conti Street.

THE OCCURRENCE OF INTESTINAL PARASITIC INFECTIONS AMONG THE WHITE PATIENTS AT THE FLORIDA HOSPITAL FOR INSANE.*

By RALPH N. GREENE, M.D.,
Chief Physician,
Chattahoochee, Fla.

Upon numerous occasions in the past the author has expressed himself upon the subject of uncinariasis, dealing with haematological, sociological and symptomatological aspects of the disease, and in the present article wishes to further express his views, based upon the microscopical fecal examination of specimens from 407 of the white patients in the Florida Hospital for the Insane. The work of instituting a routine examination of our cases was begun as a matter of statistical importance to the institution, but the results have been so startling and unprecedented in my experience that I feel justified in presenting the same, and trust that the few remarks to follow will be of sufficient interest to warrant their introduction in this symposium of hookworm disease.

Among 220 white men, there were found 92 cases of uncinariasis, or a percentage of nearly 42. The 187 women examined showed a total of 87 cases of hookworm infection, or a percentage of nearly 47. Four per cent more women than men show hookworm infection in this series. These examinations show for the total number of cases in the white departments of the hospital a percentage of nearly 44. As a matter of passing interest, it may not be inappropos to state that 42 cases not showing hookworm infection, or a percentage of over 10, were infected with other forms of intestinal parasites, namely, trichocephalus trichouris, oxyuris vermicularis, and ascaris lumbricoides. Taking these other forms of intestinal parasites into consideration in the computation of the percentages would reveal the surprising result, namely, that among the 407 cases examined, were found 221 cases of intestinal worm infection, or a percentage of 54. Round worms were found associated with hookworms in two cases, one of these being in each sex. Trichocephalus dispar infection was noted with uncinariasis in 26 cases, 16 among the women and 10 among the men. Triple infection was noted in three cases, all men, the parasites present being uncinaria American, ascaris lumbricoides, and trichocephalus trichourios.

SOCIAL STATUS OF THE PATIENTS.

This is in reference to the social position of the patients prior to their admission to the hospital. The inference that is to be drawn from the mass of literature upon the subject of uncinariasis is that the disease is

*Read before Florida Medical Association, Jacksonville, Fla., April 8, 1910.

found only among the poorer classes, in the backwoods country districts. My observation has been that no class is exempt from the infection. Among the patients in this series are noted an actor, mechanic, housewife, educator, farmer, congenital deficient and several graduates from leading colleges and universities, and coming from some of the most prominent families in the State. I wish to say in this connection that I do not believe that "ground itch" is the principal source of infection with the hookworm, and it behooves us to disabuse the minds of the laity of the popular impression that hookworm disease

Young man admitted in state of progressive dementia. Diagnosed and treated for hookworm disease. Marked mental improvement, quiet, complacent and industrious. Soon to be considered for discharge.

comes alone from this ulcerative form of dermatitis, but while impressing them with the importance of avoiding this complication and its resulting effects, urge upon them the necessity of the recognition of the dangers of drinking surface water or eating improperly washed green vegetables, grown in sandy soil.

PSYCHIATRIC DIAGNOSES OF THOSE INFECTED.

Here, again, in my experience, the hookworm is no respector of persons. Cases are to be found in the different types of insanities, from the lowest to the highest form of psychosis. The congenital idiot, the simple dement, the precocious dement, the senile dement, maniacal-depressive cases, the morphine-maniac, the paretic and the paranoiac—all show a fairly equal distribution of the infection. It has been noted among the cases infected, that no matter what the form of mental disease depression exists, and those cases which ordinarlly should show evidences of excitability and elation, are depressed and melancholy. This is well represented in one of the accompanying photographs of two sisters, both of whom were admitted to the hospital in the same year, with history of hereditary consanguinity, and classed as cases of dementia praecox. One of these women has been in a state of continued manical excitement with its characteristic impulsiveness, laughing and grimacing, so common in this particular form of mental disease, while her

A case of simple progressive dementia. Advanced hookworm infection. This is probably the principal etiological feature in the psychiatric history.

sister so evidently a victim of hookworm disease, sits in an abject state of depression, yet presenting symptoms of dementia praecox, as evidenced by attitudinization, psychomotor retardation and other common symptoms of this important form of mental disease.

HOOKWORM DEMENTIA.

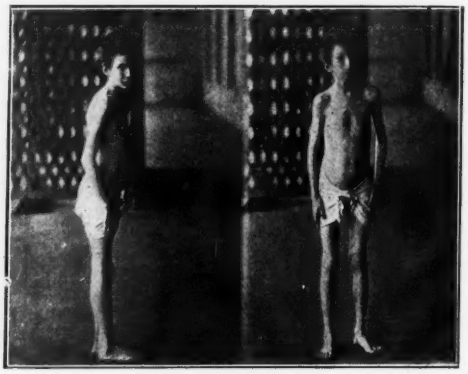
The essayist is convinced that the hookworm infection is, in many cases, the direct or

indirect cause in the production of a distinct psychiatric entity, which will, I believe, be eventually classified according to its etiology. Space will not permit of a full and complete discussion of the mental symptoms in these cases. My distinguished colleague, Dr. James H. Randolph, of this city, with whom I had the pleasure of studying some of these cases during his term of service as chief physician in the hospital at Chattahoochee, agrees with me, I believe, that the principal symptoms noted were psychic retardation, irritability, depression, lackadaisicalism and blunting of the higher sensibilities, to a greater degree than is common in other forms of precocious dementia, notably dementia praecox. The accompanying pictorial representation of the cases will give a better and more graphic picture of the victims of hookworm disease than I can describe in this brief statistical report.

The result of this examination, embracing as it does only one class of the human race, and that the saddest type of any human image, brings forcibly before our minds not merely the statistical value of the figures themselves, but of the vital economic and sociological problems which they so forcibly and abruptly thrust before our mind's eye. A retrospective view of scientific history in medicine and surgery sparkles with the bright beacon lights of past achievements, but a projection of one eye into the future shows that we are drifting upon the reef of mental and physical retrogression, which is a menace, sinister and foreboding. The widespread distribution of this infection, sparing no class nor retreating from any environment, has brought upon the whole section an economic disaster and a threatened ruin.

It is a great blessing, however, that scientific research has laid bare facts and figures, which lifts from a great many of our people the stigma of laziness and mental depravity, and classifies them properly as unfortunates, suffering from an infection, from which, until recent years, we have, by our mis-diagnoses, been unable to free them.

Often it has been the case with the bright-eyed little boy, or rosy-cheeked little girl, full of life and vigor, begin early in childhood to manifest symptoms of infection with the uncinaria. Those bright, sparkling eyes of the boy begin to assume the protruding stare, and the rosy-cheeked, elastic-stepping little girl is converted into a sallow-faced, drooping little midget, despite the most vigorous anti-dyspeptic and anti-malarial treatment, which is so often given. The joyful frolics on the school ground become irksome and distasteful. The hour for classes having arrived, they, self-conscious that they are mental deficients, sit with stooped shoulders, pore with their



Advanced hookworm infection. Congenitla deficiency, infantilism, microcephalus, rickets. Note flaring scapulae, protuberant abdomen, and emaciated extremities. Has been in almost moribund condition, but is showing marked physical improvement since the administration of thymol, together with abundance of good food and fresh air.

"fish" eyes over simple problems and sweet truths of childhood, which their anemic brains are unable to assimilate. In the natural sequence of events their mental status, synchronously with their physical, drops farther and farther below par, and, should they escape the ills of childhood and adolescence from which they are easy prey, they may, as many have done, end their existence in an institution for the insane.

In the words of the immortal Robert E.

Lee: "How different it all might have been' if proper prophylaxis had been used; the little boy who sits now a gibbering idiot, might have been proudly riding over his productive plantation, and at night with his children at his side, been imparting to them by his conversation some of the wisdom of his own marvelous mentality. In the Senate hall his voice might have reverberated through the pages of history until time immemorial, or his valor in the field might have won him a niche in the hall of fame, and further generations might have been pointing with awe to the nation's idol, the warrior unsurpassed.

The little girl standing a picture of utter despair, in her melancholic way realizing her true mental condition, and wishing for a death that will not come, might have been the buxom mother of a flock of sturdy little imps, or she might have been a lovely young woman—a joy to her father and a solace to her mother. These pictures I do not believe to be overdrawn, and while at first glance the problem seems stupendous, the solution is comparatively simple.

I would advocate that every county and municipality appoint a physician for special work along this line, and that he should, under the direction of the State health officer, make at frequent intervals an examination of the feces of every individual within the limits of his prescribed area. A complete co-operation with the State Board of Health will enable us to wage a campaign, the result of which will be positive, and eventually rid our beloved Southland of her greatest obstacle to progress and prosperity.

CARBONIC ACID BATHS IN THE TREATMENT OF HEART DISEASE.

By J. H. HONAN, M.D.,
Bad-Nauheim Germany,

Carbonic acid baths have been used in cardiac diseases for over fifty years, and in all this time there has ever remained the question of their physiological action. Prof. Beneke, of the Marburg University, was practically the first one to call attention to the great therapeutic value of these baths in cardiac diseases.

His observations, translated in 1860, were among the first publications in the English language on the effects of carbonic acid baths in heart disease.

For twenty-five years this German physician gave careful study to these baths, leaving a very lucid and exhaustive clinical record of his observations without making clear to us just how this action was brought about or the physiological process through which it was accomplished.

Since the time of Beneke there have been many workers in the field.

In 1902, Prof. Ottfried Muller, of Tubingen, published his results obtained from experiments on 2,000 healthy individuals.

What he proved then, which was two years later verified by Senator and Frankenhausen, was that carbonic acid baths have a direct effect on blood pressure. Since then Fellner, Strasburger, Tedemann and Lund have noted a similar effect.

Most of these laboratory experiments have been carried out on great numbers of healthy subjects with artificial CO_2 baths, a series of baths of plain water at exactly the same temperature and other conditions as the carbonic acid baths, having also been given to compare the results of both series. These results have proved conclusively that carbonic acid baths have a decided action on the blood pressure.

*Read before the Section on Medicine of the Southern Medical Association, Nashville, Tenn., November 8-10, 1910.

In general, the action of the CO_2 bath is to slow the pulse.

Muller and Fellner observed this action in about 65 per cent of their cases.

This per cent differs somewhat from my clinical observations with the natural baths.

In all of my cases, with a pulse above normal, I have observed a slowing, and in but one case an increase. This was a very nervous man with pulse of sixty and a subnormal temperature of 36.5, and blood pressure of 140. In this patient I observed an increase of 8 beats after an immersion of 6 minutes.

In this action the baths resemble very much the digitalis group.

The statement that CO_2 baths lower a high blood pressure and increase a low blood pressure has met with a great deal of skepticism on the part of the profession.

This, however, is true, as evidenced by innumerable laboratory tests with artificial baths, and is borne out by clinical observations with the natural baths.

In high blood pressure cases there is always an increased tension in the arterial walls, which is relieved by the action of the CO_2 baths. Naturally the baths are given a little warmer than in other cases. In this way the peripheral resistance is reduced to the minimum.

If the high pressure is due to a poisonous irritation in the blood stream, the CO_2 baths, by their action of increased elimination, soon rid the blood of the toxic elements.

If it is due to a degenerative process in the vessel walls, the CO_2 baths will relieve it by increasing the oxygen-carrying powers of the red blood corpuscles, giving a better blood supply to the tissues and stimulating the lymphatics to greater activity. Thus absorption is increased, the tissue repair goes forward with the increased blood supply and with a purer quality of blood.

In the blood tests which I have made there has in a large per cent been found an increase in the haemoglobin, and a better developed red blood corpuscle.

In consequence of this action we get splendid results in arterio sclerosis with or without high tension. The alternate contraction and relaxation incident to the CO_2 baths has, in my opinion, a very decided influence in the beneficial results obtained in cases of diseased arteries.

This contraction and relaxation gives rise to an exercise of the arterial walls, which increases the activity of the different coats of the arteries, naturally favoring tissue change and tissue repair, and in all cases where the atheromatous process has not reached an advanced stage, the CO_2 baths improve the condition.

I wish to emphasize the importance of this action of CO_2 baths. To this blood change, or current change, is due many of the splendid results obtained with these baths. Changing the blood current from the splanchnic system to the peripheral system increases osmosis and stimulates glandular activity. To this glandular activity is due the marked increase in elimination and of urinary secretion, with a corresponding increase in its solid constituents.

Increasing the peripheral blood volume relieves the tension of internal organs, and lessens their liability to chronic disease by continued congestion.

The pulse is a good indicator to guide in the treatment and the duration of the baths.

The duration should not exceed the time that the pulse remains slowed, which, in the beginning of the treatment, is found to be 8-10 minutes, varying with different patients, and gradually lengthening as the treatment continues.

In one of my cases, after a rapid drop of the pulse within two minutes after immersion, I found after five minutes' immersion the pulse began to increase in frequency.

This, however, is rather unusual. Ten minutes might be a fair average time for the pulse frequency to rise in the beginning of the treatment. In my tests of pulse frequency I have used a bathroom in which there

was a bed. After the patient has undressed I have had him lie quietly the full length of time he was to be immersed in the bath, in this way eliminating all possibility of any disparity due to position. The patient was then instructed to slip quietly into the bath with as little exertion as possible. I then took the pulse at two minutes, four, six and eight minutes after immersion, as I had done while he was lying on the bed, carefully recording the count each time.

In a series of twenty tests, I found the pulse when at 100 or above, to drop eight to ten beats in two minutes' immersion, going down 12-14 beats after an immersion of 6-8 minutes, and usually reaching its lowest point after ten to twelve minutes.

There are cases recorded in which observers have noticed a reduction of twenty-five beats, but in none of my cases has such a reduction been noted, the lowest record in my list of observations being a reduction of twenty beats, which was reached after eight minutes' immersion. This case was Dr. C., an American physician, 32 years old, strong and active, with a normal heart and a pulse of 72 to 74. As he was eager to try the Strom Sprudel, and was to be in Nauheim but two days, his second bath was one of this kind, the current carbonic acid bath. After eight minutes immersion he dressed, walked to my office, the distance of one block, at an elevation of 20 feet above the bath-house, and after lying down for a few minutes took his own pulse and was much surprised to find it 52, calling my attention to it. I took the pulse and found it 52 full and regular. When the pulse was 80 to 90 in the recumbent position, just before immersion, the reduction seldom went below eight to ten beats. If the pulse before immersion was 74 to 80, the reduction was about six beats. When the pulse was 64 to 72, no reduction was observed, and in but one case did I notice an increase as noted above. This series of tests was made with baths at the neutral zone of temperature, which is 33-34 C. or 92 to 96 F. Below this neutral zone the pulse is found to fall not as rapidly in the CO_2 baths as in plain water baths of the same temperature, indicating that combined and free CO_2 has a sustaining power for the pulse. The reduction in the pulse due to CO_2 baths lasts longer than a similar reduction by a plain water bath. This is a very important factor in summing up the value of CO_2 baths in cardiac diseases. In ten cases of American doctors, the reduction was observed to last from eight to nine hours after the bath, and as the treatment continued the duration lengthened and became more permanent.

From the foregoing we may conclude quite positively that the CO_2 baths increase the duration of the temperature action without increasing the intensity of the temperature action. In fact, the CO_2 retards the intensity of the temperature action exactly in inverse proportion to the strength of the CO_2 ingredients in the water. When the bath has been given above the neutral zone, we find the peripheral resistance reduced, the capillaries and arteries less dialated, the pulse quickened. In proportion to the degree we raise the temperature of the water, we reduce the amount of CO_2 in the bath, as heat drives off the free CO_2, hence we see the great advantage of springs which have their natural heat and force as artificial heating or pumping disturbs the free or combined CO_2 natural to many other springs.

At the thirtieth annual meeting of the Balneological Society, held in Berlin last year, Prof. Ottfried Muller gave the results of his investigations in pulse volume. He, together with Liwschutz and Veiel, carried out a series of experiments on hundreds of healthy individuals, the work extending over a period of seven years, in which time they took a very great number of tachygrams, proving conclusively the marked influence of carbonic acid baths on pulse volume. My clinical observations confirm the results of the laboratory findings of Muller. In all of my cases where the baths were given at or below the neutral

zone, I found an increase in the pulse volume, as tested by sphygmographic tracings taken before and after the treatment. CO_2 baths produce two effects which are most important as active agents in cardiac diseases, namely, heart energy and lessened capillary resistance. In so far as we are able to produce these two effects in any given case of heart disease, in just such measure will the condition be improved. Lessening the peripheral resistance allows the ventricles to become more completely emptied, admitting of a full and normal systole. By increasing the peripheral blood space in the capillaries and arterioles, the back pressure in the right heart is diminished and the pulmonary vessels acquire increased functional activity, the liver is relieved of its congestion, and often reduced very much in size, admitting of more normal and active function. I have taken a number of sphygmographs in cases where the pulse has been slowed by the CO_2 baths and find the sphygmic period is changed very little in time. These tracings show most of the change in time in the slowed pulse to be in the period of rest The percussion wave, the tidal or predicrotic wave, and the aortic notch are in relatively the same position as regards time in the slowed pulse, but the period from the dicrotic wave to the beginning of the next sphygmic period is perceptibly lengthened.

In slowing the heart's action we find this period of rest which follows ventricular systole lengthened, thus enabling the heart to regain the reserve force so essential to its normal function. This is most important, for in the final summing up of most heart cases the tonicity or reserve force of the myocardium is the essential point to consider in forming a prognosis. This was well demonstrated in a case which came under my observation during the past summer. In Madame M., age 66, born in Finland, the mother of a large, healthy family, there was present cyanosis, dyspnea and some edema. The liver was enlarged and gave a faintly palpable pulse. With all these evidences of altered mass movement or blood volume and an increased resistance in the periphera, the systolic blood pressure was 162, the diastolic Hg. 74 m-m. This practically normal systolic and diastolic pressure was found to be due to reduced energy in the myocardium. The heart was dilated, apex 2 inches to the left of nipple line and well into the sixth interspace, the right border 6 centimeters to right of the sternum, as shown by the orthodiograph. The stasis in the arteries was quite marked, and during the diastolic period the vessels remained full, which was evident not only by palpitation but also by the normal diastolic blood pressure as registered by the spygmotonograph. There was a regurgitant jugular pulse showing a stasis of the right auricle. This was again evident by the pulsating enlarged liver. This patient was under treatment for six weeks, in which time she took 24 CO_2 baths. At the end of the time I took another orthodiogram and found the heart reduced 4 centimeters, while the pulse amplitude had increased and venous pulse in the jugular and liver had disappeared. The patient could walk with much less dyspnea. The pulse in the beginning of the treatment was 102, with weak, imperfect systoles. When she had finished the balneological treatment her pulse was 82, the blood volume increased, apex impact much more pronounced. The cardiogram taken at this time showed the ventricular contraction to be much stronger. This was also shown by the louder systolic murmur due to more forcible contraction of the ventricles. This case demonstrates the possibilities of the CO_2 baths, and shows that where there is sufficient reseve force left in the myocardium to respond to a stimulus, that after peripheral resistance has been relieved and increased elimination has been established, a great benefit may be derived from these baths. The sphygmographic tracings in this case prove not only how valuable these instruments are, but also point strongly to their limitations, namely, that we must rely on these instruments not only

in so far as we are able to estimate all the factors which may influence blood pressure in each case. Many have raised objections to the use of the sphygmograph and of the sphygmotonograph, arguing that the variations registered by these instruments on a patient at different times of day when perhaps the instruments register 20 Hy. m-m change in the blood pressure in the same individual within a few hours, show them to be unreliable. I feel the premises for this argument are false, and that every variation is due to a direct cause. If the instrument is properly adjusted the cause must be sought for in the patient. These instruments are today so constructed that any physician with only an elementary knowledge of physics may after a little practice operate them with accuracy. I am convinced that there are sthenic forces within the body which exert an influence on blood pressure of which we have yet to learn! It is the duty of the practitioner to use every possible aid to an accurate diagnosis, and doubtless if the sphygmotonograph were more generally used we should not so often see the mischievous results of the indiscriminate use of digitalis. There are no mineral baths to which the skin of the human body is so sensitive as it is to the CO_2 baths and none that has such a uniform and constant action. It is seldom one finds a patient whose skin does not react to the CO_2 bath. Indeed, it is more often that we find the reaction too intense. When such is the case, the CO_2 in the natural bath is reduced before the patient enters the tub. On the other hand, if we have a patient whose skin is too sluggish to react with the natural spring water, we add Mutter Lauge, or mother lye, in a sufficient quantity. Mother lye is a concentrated solution of the spring water obtained from sale works. Even when the bath is given at a temperature much below the neutral zone, the patients find, though the water is cold, there is an agreeable sense of warmth when lying perfectly still in the bath. This is due to innumerable fine bubbles of CO_2 gas that adhere to every particle of skin exposed to the water, completely enshrouding the body in a coating of carbonic acid gas. If these minute bubbles are removed from the skin, they will again form, that is, if the patient remains quiet. The constant interchange of these small bubbles has a very significant value in producing the physiological action of CO_2 baths. The CO_2 gas contained in these bubbles produces an irritation of heat, while the particles of water touching the skin produce an irritation of cold. Thus there is a thermal contrast which is highly stimulating to the peripheral circulation, and has a marked reflex action on the heart. A temperature below the neutral zone is an important factor in getting the best results of CO_2 baths.

The contra-indications to the CO_2 bath treatment are few but positive, and should be strictly observed when selecting cases for bath treatment. If the patient suffers from orthopnea while in the recumbent position, or has cardiac dyspnea on very slight exertion, he is in no condition to journey to a distant Spa. Should a physical examination reveal marked abdominal ascites due to a degenerative heart-wall, baths will be of no use. CO_2 baths are also contra-indicated in aneurysms and in acute endocarditis.

Some writers have placed arteiosclerosis or arterial degeneration in the list of conditions which contra-indicate balneological treatment. This does not agree with my experience with these cases at the CO_2 springs, neither does it agree with many of the best authorities of Germany, Romberg, for instance, in the last edition of his excellent work, "Krankheiten des Herzens u der Blutgefasse," says, in speaking of the contra-indications to CO_2 baths: "Die Arteriosklerose als solche bildet aber keineswegs ein Kontraindikation."

On the contrary, the great majority of these cases are greatly benefited by the CO_2 bath treatment. Even in advanced stages of the disease, where the baths are given cautiously, much relief may be obtained. The class of patients who come to Bad-Nauheim for treat-

ment are, on the whole, well-to-do, and in my experience it is rare one finds in this class calcareous changes in the vascular walls. These patients seldom have the brittle, calareous arteries such as, in my clinical work in Berlin I have found among the hand-workers. We must recognize two forms of arterial degeneration, the first, and by far the most prevalent among the well-to-do class of society, many of whom have a very highly developed nervous organization, brought on by strenuous living, and a seeming inability to relax. These are the hypertension cases, and though we may find a fibrous degenerative thickening of the vascular walls, we seldom find a calcareous, brittle artery.

In studying my history records of cases exhibiting a hypertension with a blood pressure of 220 to 240, I have been amazed to find a very large per cent with absolutely no indication of intoxication from lues, alcohol, tobacco, etc., which Huchar and Kraus have given as most potent causes of high blood pressure in presclerosis. Felix Hirschfield mentions cases which have for twenty years exhibited high blood pressure without manifesting other untoward symptoms. The CO_2 baths relax the tension and by increased elimination correct the polycythemia which is present in a large per cent of these patients.

In the cases suffering from hypertension which I have studied, about 80 per cent are improved by the CO_2 baths treatment, and the blood tests made before and after the treatment showed a marked decrease in viscosity. I have occasionally been surprised and disappointed at patients who have taken the baths well, and in whom one could see a marked improvement, to find on taking their blood pressure at the end of the treatment that it has been reduced but a trifle, 4-6 Hg. m-m, and in some that there was no reduction at all. These patients tell you they are very much better than when they began the treatment, "the fullness" they complained of has disappeared, their bowels are more regular, kidneys more active, they walk much better and they say they "feel lighter on their feet."

But in spite of this marked improvement there is found no reduction in their hypertension. This is perplexing and teaches us that we must not accept the blood pressure as an absolute indicator of the general condition and that we must rely more on the subjective symptoms collectively.

The result of my clinical studies convinces me that CO_2 baths, in most cases, reduce high blood pressure, raise low blood pressure, increase pulse volume, increase elimination, increase pulse amplitude, increase heart energy, increase duration of temperature action, reduce peripheral resistance, reduce dilations and relieve nervous irritability.

COLLAPSE OF THE TRACHEA WHILE PREFORMING THYROIDECTOMY*

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Interest in any particular surgical procedure centers not alone in accomplishing satisfactory results by some definite technic, but also in avoiding dangerous situations the result of irregular anatomic relations, developmental defects, pathologic changes or physiologic idiosyncracies. How unfortunate for statistics is some unusual adhesion to the thinned coat of an important vessel or hollow viscus; the mal relation of some vitally necessary tissue to the field of operation; the extension of infection beyond safe encapsulation. Yet these are the conditions which characterize surgery

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and necessarily possess a lively interest for those who daily may meet with them.

The subject of this paper directs attention to one possible complicating difficulty in the performance of thyroidectomy. This operation for hyperthyroidation or exophthalmic struma is always more or less serious because of the marked vascularity of the gland, the friability of the blood vessels, the capsular adhesions, the loss of general vascular tone and the tremendous nervous excitability. In addition to this, the relation of the gland to the vessels and nerves of the neck, the danger of removing the parathyroids and the possibility of collapse of the trachea during the necessary operative manipulation of the gland, make it one of importance when done for any condition whatever.

During the last fourteen months I have twice had the trachea collapse while performing thyroidectomy for exophthalmic goitre, and these experiences suggested this paper.

The first occurrence was in a woman fifty years old who was admitted to the hospital October 26, 1909. The goitre clinically and pathologically was hyperplastic in type. To the examining finger it was about three to four times the normal size, more especially the right lobe. A Kocher Kragenscitt was made. Vascularity was marked, as was also friability of the vessel walls. While attempting to raise the inferior pole of the gland out of its bed, the superior vessels having been tied and cut, a marked dyspnoea began. Bleeding from the wound was rather free because of the labored efforts to obtain air, and this flooded the operative field with blood. An effort was made by the doctor helping me, to catch a bleeding vessel at the lower part of the wound and immediately all air was completely shut off from the lungs. A transverse snip of trachea, which was found collapsed, revealed the fact that the forceps had partly included the trachea in its bite. No preparation having been made for such an occurrence the trachea wound was held open during the completion of the operation by forceps. Fortunately the trachea remained open after removing the right lobe and isthmus of the thyroid, thereby avoiding the use of a tracheotomy tube. The transverse tracheal wound was closed with cat-gut. The neck wound was drained in the usual manner. November 2 the patient was discharged, the wound having healed. Prophylactic doses of sodium salicylate were used to prevent pneumonia or local infection. Progress was normal throughout.

The second occurrence was also in a woman, aged thirty-nine years, who was admited to the hospital September 29, 1910, suffering from a moderate exophthalmic goitre and a cyst adenoma of the breast. The breast was removed the following day. After recovery from this, October 10, the right lobe of the thyroid and a much inflamed central mass of thyroid tissue were excised. The collapse of the trachea again occurred while shelling the gland from its capsule. The difficulty of this operation was much exaggerated by the thyroid tissue which saddled and interfered with access to the collapsed trachea. The trachea was entirely out of sight when the collapse occurred, but the former experience led to the immediate recognition of the trouble. This case presented another difficulty in that the trachea seemed to have no power to retain its normal rotundity even after removal of the thyroid and a tracheotomy tube had to be used for twenty-four hours to prevent its recollapsing. After this time a simple gauze drain in the neck wound was used. The wound became infected, though she eventually made a complete recovery. No penumonia developed, though grave fear was entertained it would, because of the direct opening into the trachea from the suppurating wound.

Collapse of the trachea is not very common, judging from records, yet I suspect it is commoner than these might lead us to believe. These two cases have been the only ones in my experience; both occurred within the short period of a little more than a year. The views

of many as to the cause and the treatment (preventive and curative) of collapse are a bit at variance with mine, formed by this limited experience. This leaves me to conjecture whether my cases were unique or my observations incorrect.

That predisposing cause of collapse of the trachea is the anatomic defect in the rings posteriorly. This allows the lateral walls to approach closer under pressure and to change the cross section of the tube from a circle to an oval with its long diameter antero-posteriorly.

Another factor which I am inclined to believe partly influential in starting a collapse is the proximity of the recurrent laryngeal nerve to the thyroid gland. This nerve, even though avoided in the use of knife or forcep, is subjected to more or less trauma by pulling or pressure, while removing the gland. This leads to abductor paralysis with consequent labored inspiration and the production of a marked negative tension within the trachea.

Lastly it is possible that more or less softening occurs from the toxic effect of the gland secretions. Rose and Eppinger record pathologic changes, but E. Muller found nothing of note. In my two cases no pathologic examination of the cartilages could be made, but to touch and to vision there was no evident softening.

The symptoms of collapse began while trying to shell the lower pole of the thyroid out of its capsule. Labored inspiration was immediately marked and the arterial blood quickly became venous. In the first case the examining finger easily detected a completely flattened scabbard trachea, but in the second, owing to the mass of thyroid tissue about the trachea, it was impossible to absolutely diagnose the condition by touch until the central lobe was removed. This had to be done in the face of a very free venous hemorrhage and the situation was anything but inviting. As soon as the trachea was reached in both instances an immediate opening was made and air admitted to the lungs.

In both of the cases, I had to deal with collapse of the scabbard trachea. In the work of Ochsner & Thompson on the "Thyroid and Parathyroid Glands," collapse is spoken of as a condition resulting from loss of support given by the gland to a soft and plastic trachea. The anterior wall is described as then falling in like a valve. No mention is made of the collapsed condition I have described as existing in my two cases. Kocher has called attention to the fact that the anterior wall is the most resistant part of the tube and uses this as fulcrum over which to tie sutures imbedded in the lateral wall, to prevent or relieve collapse.

It is possible that in the experience of others this anterior wall collapse has been usual, but I do not see the reason for it. In the first place the entire series of rings would have to be very soft, otherwise a rebound of the cartilages would tend to keep the lumen of the tube open as soon as pressure is removed. In the second place, the tendency of thyroid pressure to make the cross section of the tube oval, with its long diameter anterior-posterior, would give to the anterior surface of the trachea the greatest weight or pressure supporting capacity and to the lateral walls the least. The only occasion for such an anterior collapse as I see it, is the removal of a retrosternal median growth of thyroid which occasions a considerable degree of pressure upon the trachea immediately anteriorly.

The type of obstruction resulting from kinking of the trachea due to an irregular point of pressure from a thyroid growth above the sternum is immediately relieved by removal of the growth, and does not give the symptoms of collapse here spoken of.

The question naturally is presented, how shall these conditions of tracheal collapse be guarded against. Kocher has suggested that in all scabbard tracheas in which collapse is apt to occur it is best to introduce two lateral sutures, one on either side, and tie them over the anterior face of the trachea. The impossibility of doing this in some cases is shown

by the second of mine. It was quite out of question either to determine the shape of the trachea or to use such sutures until the gland was removed in large part. In the first case this might have been done had I suspected such a possibility.

The method of cutting the isthmus and removing the middle lobe first, then working outward, might be recommended as doing away with the evil of pressing against the trachea through the thyroid while shelling it out. Yet I believe few operators who have done thyroidectomy a score of times or more would use this method as routine. I am convinced the condition in which collapse is going to occur is not definitely definable beforehand and an operator must follow some definite technic in performing all the operations. In my cases collapse unquestionably was aided, if not wholly caused by pressure on the trachea while enucleating the lower larger pole of the thyroid. This was done, too, without undue haste or force, and the shut-off in breathing came in both as a surprise. The one prophylactic measure which I suggest as a means of avoiding pressing upon the trachea is a para-sterno-cleido-mastoid incision. This enables the operator to raise the gland out of its bed without medianward pressure of appreciable degree. No doubt a collar incision with enucleation from between the sterno-hyoid and sterno-thyroid muscles of either side necessitates a considerable pressure upon the trachea. While working out the problem of removal of the thyroid under local anesthesia I found it very much easier to do so by the para-muscular than by the collar incision. Manipulation was easier and discomfort minimized. I experimented upon the cadaver in developing a technic and removed over twenty goitres under local anaesthesia before using a general anaesthetic. This is excluding my first case operated upon in the early nineties, to which chloroform was given.

Of late years I have used the collar incision, possibly modified slightly, but I am rather of the opinion that my former plan of a para-muscular incision gave a better field, made operating easier and did not leave an uglier scar. I believe this incision would prove a valuable prophylactic against tracheal collapse.

As to treatment at the moment of collapse all agree that a suture or hook which enables the operator to pull open the trachea is most desirable, but this is in fact not so easily applied in many cases, I judge, reckoning from my own experience. If it can be done, of course I shall resort to the measure, but if not, I shall not hesitate to open the trachea in the wound. The fear of pneumonia is not as great as it would seem if proper surgical care has been taken. In the majority of cases I am certain the tracheal wound can be immediately closed with cat-gut and the neck wound treated as usual. It has not been my experience that suppuration occurs after thyroidectomy as often as the very universal custom of draining the wound indicates. I rarely find drain necessary. When the trachea collapses after opening it and when left without support following complete removal of one or even both lobes (a condition which must be somewhat rare), a tracheotomy tube becomes a necessity. Handling the case afterward is conducted along well prescribed lines.

I have not had nor have I seen collapse of the anterior wall, but in the cases of pressure collapse while removing a retro-sternal growth of thyroid I am inclined to believe that as soon as the growth is out, the trachea will open through the elasticity of its own cartilages.

PATHOLOGY OF ANTERIOR POLIO-MYELITIS

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From an historical point of view, the development of our present knowledge of the pathology of anterior polio-myelitis is quite interesting. Cornil, in 1863, basing his deductions on the postmortem examination of cases dying of subsequent disease, described this condition as one of primary cell degeneration, having its selective action upon the gray matter of the anterior horns and nerve fibers arising there. In 1870, Rogers and Damaschino, after examining some acutely fatal specimens, demonstrated the inflammatory nature of the process, and consequent degeneration of nerve cells, still claiming its restriction to the anterior horns. While there has been much subsequent work upon the subject, this has been the accepted pathology, and is so stated in most books.

Recent writers have uniformly accepted the careful researches made by Harbitz and Scheel, of Christiana, during the Norwegian epidemic of 1905 and 1906 as the basis for the established pathology of polio-myelitis, which is especially gratifying, as it conforms to the new light upon the etiology and probable bacteriology. The exhaustive experiments upon monkeys, made by Flexner and Lewis, of the Rockefeller Institute, have done much to elucidate the subject, proving beyond doubt that the disease is due to an infection with some living reproducing organism, probably ultra microscopic in size, as is shown by the ability to transmit even through twenty-five generations, by intracranial injections of the filtrate of the emulsified diseased spinal cord, thus proving beyond doubt, by its intensified action, that it is *bacterial,* and not a toxin. This nullifies the patient toil of many preceding observers, who, recognizing from the epidemic character of the disease that it was probably of bacterial origin, had spent much time in searching the causative organism. Another cause for failure in investigations has been the negative results in working with the cerebrospinal fluid, which is perfectly clear and negative throughout the disease except, as Flexner and Lewis have shown in experiments upon monkeys, it becomes turbid two days before paralysis, that is, before we can recognize the condition.

Accepting the approved definition that the disease is a general infection, we might expect involvement of other viscera, even though it reserves its selective action for the cerebrospinal centers. The findings outside have been disappointing. Considering the probable modes of infection, we might look for postnasal and intestinal lesions, though it is probable that these have vanished before the case terminates fatally. Heart, liver, kidneys, etc., have been accused of unusual conditions, but they are not constant. The Thymus gland is unusually active, but the period of greatest morbidity, the second year, represents a period of rapid change in this organ. That the disease is a general infection is shown by the toxicity of a lymphnode and the blood as demonstrated by Flexner and Lewis.

Harbitz and Scheel discuss the findings in the central nervous system under two heads, first in patients dying in the acute stage in the height of the diseased process; secondly, in those cases dying after defervescence of acute symptoms. Basing their deductions upon seventeen acute cases, they thus describe the condition. The microscopic findings are disappointing. The cord is congested, especially along the anterior portions and anterior horns with an occasional small hemorrhagic infarct; this condition is exaggerated at the lumbar and cervical swellings, though generally diminishing in intensity as you go up.

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Microscopically, we find a diffuse infiltrating inflammatory process, following the blood vessels, with proliferation of cells into the perivascular lymph spaces, most marked in the highly vascular regions, hence the more decided involvement of the anterior horn. Nor is this process confined to the cord. It is coextensive with the pia mater and its prolongations, the microscopical condition being one of general hyperaemia, with occasional slight hemorrhages, and cell infiltration, accentuated in the anterior horn. It is probable that the pia is first involved, as the cord under it may not yet show signs of inflammation. With this meningitis probably comes the infection of the cerebro-spinal fluid, and then extension along the vessels to the cord. No part of the pia is entirely free from inflammatory products. That covering the medulla and pons is always involved. Then the meninges of the base, then along the floor of the fourth ventricle to the sylvian fossa, involving neuclei of all the cranial nerves and even the deeper ganglia, reaching them by the blood vessels. Even the pia on the cerebral cortex is affected. Harbitz and Scheel make the statement that in *severe* or *fatal* cases, we have, as a rule, diffuse inflammation of the entire cord with its pia, of the entire medulla and pons, of the basal ganglia, and often also of the cortex of the brain to a greater or less extent, always in connection with a similar inflammation of the pia. Nearly all fatal cases terminate by paralysis of respiration, and in these we find oedema of the floor of the fourth ventricle, with an extension of the inflammatory process well up the sylvian acqueduct. The destruction of the ganglionic cell is a secondary result of the inflammatory process and the cell infiltration. The activity of the inflammation and the resistance of tissue determines the extent of this, which of course determines the character of the permanent paralysis.

Such is the picture of an anterior polio-myelitis infection, the real disease, tissue resistance and intensity of the inflammation determining the location of the resulting paralysis. The actual infection and the inflammatory condition is generally coextensive with the pia, the weaker ganglionic cells with the greatest inflammatory exudate marking the extent and location of the paralysis, hence the symptoms and nomenclature, all parts of the same process. Strumpell many years ago suggested the probable etiologic connection between diseased processes in widely different localities in the nervous system.

The above findings were all in severe and rapidly fatal cases, dying when lesions were at their height. Harbitz and Scheel also examined four cases dying of intercurrent conditions, when the cerebro-spinal process was in the stage of repair, and find, even here, evidences of the same inflammatory process all through various parts of the pia, showing that even in milder cases there is the same extensive inflammation.

The resulting changes in the cord during the process of repair have long been known. The ventral horn is much atrophied, ganglionic cells are degenerated and diminished in number. Certain fibers of the anterior nerves have disappeared, there still exist infiltrated round cells, evidences of the inflammation. The muscles supplied by affected nerves become flaccid, atrophied, possibly resulting in unapposed contractures. In children with extensive paralysis there is trophic change in the bone, resulting in stunting the limb.

The burden of this paper is to show that anterior polio-myelitis is an infectious disease, affecting the pia mater of practically the entire central nervous system. That the actual infection is accompanied by cell proliferation into the perivascular lymph spaces, the amount and location of said cell proliferation due to this infection, together with tissue resistance, that is, the ability of the nerve tissue to take care of the products of inflammation, determine the type of the disease. When all is absorbed with no appreciable ganglionic destruction, we have the so-called abortive type. When we find localized destruction of some cells in the anterior horn, chiefly in the lum-

bar enlargement, we have the common type of polio myelitis. When the pathology is localized and intense at a point involving practically the entire section of the cord, a rare condition, we may have transverse myelitis. Acute bulbar paralysis may be seen when the intensity of the disease is located in that region. Encephalitis when the cord symptoms are insignificant. Polio-encephalitis when the symptoms are general. Why could we not explain, as Harbitz and Scheel seem to think we should, Landrys ascending paralysis as part of the same process.

SYMPTOMS AND DIAGNOSIS OF ANTERIOR POLIO-MYELITIS

By CHARLES M. NICE, M.D.,
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The progress and advancement of medical knowledge is liberally shown in the symptomatic and diagnostic study of this disease, anterior polio-myelitis. It is true that the laboratory has thus far outclassed the clinical side, yet a full consideration of the reports which have come from recent epidemics is extremely interesting, especially when studied with the classical text-book as a corollary.

Numerous names have been suggested to better meet the demands of our present knowledge, just as with classifications which have been sought to correspond with the varied determination of symptoms. For the purpose of study, the writer would like to follow the general custom and suggest that the name *cerebro-spinal polio-myelitis* be substituted for the many now in use, believing that it more nearly meets the pathological and clinical aspects as they are presented to us.

As you know, the disease is most common in infants and childhood, though the elderly are not excepted. It occurs in the summer and fall months, the winter in some way appearing to be a factor in dissipating the infection.

As a working classification, the disease may well be considered as appearing under three types: (a) mild, (b) severe, and (c) abortive. Any or all of these may occur in the same epidemic or even in the same household. In the *mild type,* the symptoms may be so mild as to escape unnoticed by the family or attendants and the true nature of the affection only discovered after disability or paralysis has occurred. Even the paralysis may affect only a muscle group or two, and the recovery be so rapid that the afflicted one is able to walk or be around within a few days. The *severe type* may end its subject by death within a short time after the onset. It is associated with suddenness, great pain, fever, prostration and perhaps with uncontrollable convulsions, dyspnoea and coma. The resulting paralysis may be of bulbar origin, giving pneumogastric distribution, always to be considered with gravity. Or there may be extensive and irreparable paralysis leading to marked atrophies and deformities. The *abortive type* may display either of the above characteristics, but with an abrupt ending of recovery and without paralysis.

The symptoms may be further divided into *cerebral, spinal* and *neuritic,* or there may be any combination of these irrespective of the type of disease. These terms are used to designate the characteristics of the preponderant symptoms in a given case. In the first instance, the onset is sudden, with severe headache, prostration, possibly delirium, convulsions, a retracted head and the presence of a Kernig's sign. In the second instance, the onset may be just as sudden, but the symptoms

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are chiefly referable to the spine, as pain, a stiffened back and paralysis early, of the motor type. The neurotic variety has great pain in the extremities, with marked tenderness along the nerve trunks.

The disease passes through three stages, as follows: (1) *stage of onset,* (2) *stage of paralysis,* and (3) *stage of convalescence* and result.

The *onset* is preceded or accompanied with a few hours to a few days period of indisposition, restlessness and somnolence, to which little attention is ordinarily paid. In 80 per cent of the cases there is a disturbance of the alimentary or respiratory systems such as constipation, diarrhoea, angina or bronchitis. Following these, there is an abrupt onset of symptoms resembling in every way an acute general infection. Vomiting, a chill, convulsions, headache, prostration, fever, sweating and great pain along the spine and into the extremities may ensue. The convulsions may be general or localized in distribution and may last from a few minutes to some hours. The headache is severely complained of and often associated with nuchal rigidity. Tenderness is also noted along the spine and extremities, especially when pressure is made over the large nerve trunks. The fever ranges from 99.5 degrees F. to 104 degrees F., and the pulse is accelerated to 120-140.

In the severe form of this stage the patient appears to be much sicker than the symptoms may warrant. The child is listless, the face is flushed, with dark circles beneath the eyes. It lies through preference in the mother's or nurse's arms in an apathetic state, suddenly and frequently crying out with pain. Any attempt at passive motion is met with the same cry and sleep is constantly disturbed. Desire for food is not shown, though frequent appeals for water are made. The sweating above mentioned is marked and a clammy character; sudamina are common but herpes rare. Numerous other rashes have been described, none of which have been clearly observed by the writer. Anuria for a few hours is usually present at some time in this stage.

In older children emphasis is laid on the headache and backache and intermittent pain in the extremities. Tingling and formication is also frequently spoken of.

Upon examination the throat shows a redness over the tonsils and up into the nasopharynx, but this is not characteristic. Hyperaesthesia is noted. The abdomen may or may not be retracted, and the abdominal reflexes are not disturbed. The patella reflexes are unequal, perhaps slightly exaggerated, later to become diminished, depending on the involvement of the cells constituting the reflex arc in the cornea.

The blood picture is one of leucopenia, with a relative increase of lymphocytes.

The spinal fluid is obtained with an increased pressure of 130 to 140, is clear, shows lymphocytes and is otherwise negative.

The above symptoms, with the greatest variation of severity, as has been mentioned, from a mildness which goes unnoticed to a severity which is extreme. The duration of this stage is from a few hours to three or four days, ending either in death, in the second stage, paralysis, or in recovery without paralysis, which constitutes the abortive type, now recognized. Very severe onsets are oftentimes followed by mild results; again, a mild onset may be the forerunner of the worst paralysis.

The *paralysis* is a sudden acquisition to the above symptoms and is noted any time within the first few hours or days of the disease. It reaches its greatest severity within a few hours and corresponds in location to the motor seats of the cord and encephalon. The former spastic condition of the muscles gives way to a flaccidity, the constitutional symptoms begin to abate, but leaving pain of an intermittent character and tenderness over the nerves. The limb, which is most frequently affected, falls limp to the bed, has a lower temperature than its fellow, has a bluish discoloration and feels harsh and clammy. The reflexes are found to be unequal, diminished or abolished

in the affected part. A partial Kernig's may be present at this time. There is no abnormality in sensation except perhaps in the gravest cases.

When bulbar affection is noted, the consequent paralysis may be a squint, ptosis, et cetera, but these are less commonly seen since the pneumogastric paralysis, an accompanying effect, practically always ends in death.

The lower extremities suffer from the paralysis in the majority of cases as is shown by the report of Duchenne and Seeligmuller (taken from Osler):

55 per cent of cases, one leg was affected.

17 per cent of cases, one arm or both legs were affected.

5 per cent of cases, all four extremities were affected.

2 per cent of cases, both arms were affected.

In most cases only one lower extremity is involved, and when in combination with the upper, it is usually on opposite sides. The paralysis often affects the muscles in groups, the extensors of the leg, for instance, are more commonly involved than the flexors. Again, the muscles of the thigh and leg may be affected, leaving the muscles of the foot uninvolved.

The trunk muscles are rarely involved, and in the cases reported, the curvatures are exaggerated and the abdominal muscles give a dome shape made prominent on coughing or crying.

The constitutional symptoms have now subsided leaving the patient in a weakened condition. The paralysis remains stationary and reactions of degeneration begin to appear. An increased faradic current is required to obtain a response until it gradually fails. The galvanic response is at first exaggerated until it, too, gradually fails. Later improvement may be noted by a slow return of the faradic reaction.

This state of affairs may remain stationary with some degree of atrophy, softness of the muscles and a decreased size of the same for from one to six weeks, when it will suddenly merge into the stage of convalescence.

Convalescence is assumed by a spontaneous improvement in the paralyzed parts, noted first in the last muscle-group affected, and reaches its limit in from three months to a year. The electrical reactions become more normal, the skin becomes warmer and healthier in appearance and the limb becomes stronger and firmer, depending upon the quantity and quality of the improvement. Too often it is that the permanent paralyses are extensive or remain in some very important group of muscles, causing deformities that we are unable to cope with.

In the leg, the anterior tibial and peroneal group and in the arm, the deltoid are the muscles most frequently left with stains of the disease. Talipes valgus and varus associated with equinus, subluxations, shortening fractures and disproportions of members are the final ear-marks to be feared and guarded against.

DIAGNOSIS.

With our present knowledge, it behooves one to give anterior polio-myelitis a critical consideration in any case of sudden onset, symptoms of general infection, and prostration accompanied with gastro-intestinal disturbance with pain and somnolence. Added to these, the autumn months, an epidemic, presence of fever, headache, backache, and profuse perspiration with or without convulsions or delirium and the diagnosis should be arrived at before the unmistakable paralysis occurs. Spinal puncture should always be made as well as a leucocyte count, both being aids to the differential diagnosis.

When the cerebral symptoms are marked, the diagnosis may be confused with *cerebro-spinal meningitis*, but the latter occurs more frequently in the winter months and the spinal fluid shows the presence of the diplococcus intracellularis. There is an equal and marked Kernig's sign and the absence of the characteristic paralysis.

Acute cerebral palsy may have a sudden onset with fever and convulsions. It is only after the paralysis, especially if diplegic, that the distinction can be made. In this, the paralysis is spastic, there is no atrophy or trophic changes, displayed by normal electrical reactions. The cerebral symptoms are present from the onset.

Multiple neuritis may be similar in the pain, atrophy, and electric reactions, but the more gradual onset, sensory disturbances, previous history of diphtheria and finally, recovery serve to make the distinction.

Acute transverse myelitis is characterized by anaesthesia, ankle clonus, involvement of the sphincters and absence of degenerative reactions.

Pseudo-paralysis of scurvy and *muscular weakness* of rickets are to be differentiated by the spongy

gums and painful knees in the former, the signs of rickets, bilateral changes and absence of degeneration in the latter.

Hip joint disease and *localized traumatism* with fever are distinguished by previous history and electrical reactions.

Influenza, typhoid, para-typhoid, rheumatism and *auto-intoxication* are to be distinguished by their special symptoms common only to themselves and absence of nervous and atrophic muscular changes peculiar to anterior poliomyelitis.

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TREATMENT OF ACUTE ANTERIOR POLIO-MYELITIS

By A. W. HARRIS, M.D.,
Nashville, Tenn.

For the sake of convenience the treatment of acute anterior polio-myelitis will be discussed under four heads: (1) Prophylaxis, (2) the management of the acute febrile stage, (3) the management of the stage after the subsidence of fever up to the end of the first year, and (4) the treatment of old or neglected cases, with their resultant contractions and deformities.

The recent proof of the fact that polio-myelitis is an acute, infectious disease, probably due to a specific micro-organism, influences us greatly in our treatment. Quarantine and isolation are now imperative procedures, and while it is admitted that it is not an actively contagious disease, enough evidence of its contagiousness has been secured to make us wish to take all the precautions possible to prevent its spread.

We should not look on the occasional case we see as a sporadic case and institute no measures to prevent its spread, but should rather treat it as the possible beginning of an epidemic and promptly isolate and quarantine it.

A few years ago Massachusetts, recognizing its possible contagious nature, placed it among her reportable diseases, and in the past few months after the fact of its contagion has been clearly proven other States followed this lead and now some six or seven require a prompt report of all cases, just as they do of scarlet fever, diphtheria, etc. The Board of Health of the State of Tennessee at its last meeting passed such a resolution.

In experimental work one atrium of infection seems to be the naso-pharyngeal mucosa just as it is in cerebro-spinal meningitis, and since weak solutions of hydrogen dioxide are destructive to the virus, it would seem wise to cleanse the mouth and nose of those persons who have been exposed to the infection with this agent. It has also been shown that this is not the only channel of entrance of the virus, and of course this will not have prophylactic effect in all cases, but since we have so little definite knowledge of this virus, until such knowledge is given us we must use all that we have, however insignificant it may seem.

We might speculate at length on the pos-

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sibilities of a serum treatment, but will simply state that in his experimental work Flexner has produced an immunity with serum obtained from cured cases, and in some instances has markedly influenced the course and extent of the pathological process by the injection of this serum, in cases recently inoculated with the virus. How long this immunity will last, and whether it is applicable to human cases are still open questions. Should it protect human beings as well as monkeys, it might be used in a prophylactic way; but as for the treatment of the actual disease with it we are still handicapped by the fact that few cases can be diagnosed before the damage is done and the paralysis developed. It would be of especial use in epidemics where we are on our guard, so to speak, and constantly on the lookout for new cases.

Should we be so fortunate as to diagnose our case early the question of how to manage the acute onset confronts us. The patient should be kept in the recumbent posture and removed from all exciting influences and surroundings, a brisk purgative administered and a suitable diet for a febrile condition instituted. Should there be much pain and nervousness, bromide is probably the best drug. In cases with excessive fever hydrotherapy should be employed; mild counter irritation and cupping of the spine may be resorted to. Severe counter irritation and blisters are barbarous and harmful, exerting no beneficial influence on the pathology and increasing the patient's nervousness and pain.

Since this is beyond doubt a general systemic infection, elimination is most important. The room should be bright and well ventilated and, the weather permitting, the patient kept in the open air as much as possible. After our initial purgative the condition of the bowels should be watched daily and the other organs of elimination taken care of, large quantities of water administered by mouth and the condition of the skin kept as good as possible by warm baths. Since the circulation of the affected limb is markedly interfered with it should be loosely wrapped in woolen bandages and artificial heat applied and your patient made comfortable in every way. As for drugs, many have been used and each one has its champion, but no one has been agreed on. Belladonna and ergot theoretically should do good, but in actual practice are of little benefit. Recently urotropin has been advised, since after its administration formaldehyde is found in the cerebro-spinal fluid, but since this fluid shows no characteristic changes early, it would not reach the focus of infection soon enough. However, its administration can do no harm and might assist in combatting the general infection. The use of strychnine in this stage is theoretically harmful and should be reserved till later in the disease, when it might have a decidedly beneficial action. All other treatment of this stage should be symptomatic, always remembering that in our efforts to relieve we can do harm by doing too much.

After the fever has subsided the management of the case resolves itself into limiting as much as possible the final paralysis, the preservation of function, the protection of the nutrition of the affected muscles and the prevention of unsightly and disabling contractures and deformities.

Lovett and Lucas make the statement that deformities are largely if not wholly unnecessary, for by a careful study of the case they can be anticipated and the proper measures instituted to prevent them.

The general health of the patient is of utmost importance. Fresh air, proper food and perfect hygiene should be demanded. In about two weeks after the subsidence of the fever massage may be begun, very light at first and gradually increased to enough to maintain a good blood supply in the member and to give the disabled muscles exercise. The affected limb should be placed in such positions as will least favor the development of contractions, and these positions changed as often as is necessary to promote comfort for the patient. Now, general tonics may be administered, in-

cluding strychnine. We should determine now, by electrical tests, those muscles which will be permanently lost and those in which we can hope for improvement. Do not let these findings, however bad they may seem, deter you from persistent effort with massage, for it is remarkable what good results can be attained with prolonged, thorough massage and other mechanical measures, even in apparently extremely unfavorable cases.

Electricity will not aid us much in this direction except as above indicated. It may be used in this stage, however, and is still advocated by some writers. Next to massage, and going hand in hand with it, is what might be termed "muscle education." In all those muscles which have any signs of life the patient should be made to attempt voluntary movements and these movements assisted or actually carried out by the attendant. Each muscle group should be treated in this way, and persistence and patient perseverance will frequently be rewarded with very satisfactory results. Where the muscle or a group of muscles is completely paralyzed, often others can be educated to fulfill their functions. Exercise in the open air as well as in doors is beneficial and should be regulated and adjusted to meet the indications in each individual case, bringing into play but not exhausting these weak muscles. In some cases it will be found necessary to adjust some form of brace to prevent contractures, to be worn especially when the patient is asleep or at rest; such appliance should be light and as simple as it is possible to make it. Too much stress cannot be laid on massage, for it is through this means that most of our cases are benefited and in its wise and persistent use over a long period of time some really remarkable results have been reported.

The treatment of the old or neglected cases embraces too large a variety of conditions to permit of a discussion in a paper of this kind and the outline of only a few of these therapeutic measures will be mentioned. Here the orthopoedic brace plays an important role and should be modeled on the lines laid down. Many cases can be improved and a useful member obtained by operative measures, such as tenotomies, tendon transplantation, tendon shortening, arthrodesis and others. Some writers claim excellent results in nerve grafting. The gravity of interfering with healthy nerves should be borne in mind in this operation, but in those cases in which tendon transplantation and other less dangerous measures are impossible or fruitless, it should at least be considered. In cases where all measures have failed or none are possible of application, if the member is more of an inconvenience than use, amputation may be resorted to.

Experimental work is still being carried on in this country and abroad and all the recent knowledge gained as to etiology, pathology and clincal types should give us much encouragement and lead us to expect that in the near future a more certain means of making an early diagnosis and probably a specific therapeutic agent will be furnished us.

CERTIFIED MILK.*

By DANIEL T. McCALL, M.D.,
Mobile, Ala.

Twenty-three years ago the medical crusade for clean milk was started by Dr. Henry L. Coit, of Newark, N. J. His efforts to secure a good, clean milk for his own infant son who had been deprived of the maternal breasts, revealed to him the bad milk conditions of Newark and its outskirts. He reckoned that other towns and cities of his state were likewise afflicted, and at his suggestion the Medical Society of the State of New Jersey appointed a committee to investigate the relationship between infant mortalities and

*Read before the Medical Society of Mobile County, Ala.

milk supplies and to recommend and seek such legislation as was necessary to improve the milk conditions. This committee worked for two years, and failing to secure the proper legislation, Dr. Coit conceived the plan of professional supervision of dairies whose product should at all times conform to fixed standards and requirements. He presented his plan to the Essex County (N. J.) Medical Society, which adopted it, and appointed the first medical milk commission in 1893. The scheme for the production of this milk is best defined in the original outline, from which I quote:

1. That physicians give their practical support to an effort conducted by a medical milk commission selected by a medical society which shall endeavor to bring to the city a supply of milk produced under such regulations that purity shall be assured.

2. That approved and trustworthy dairymen possessing honor, financial ability, and dairy facilities shall be induced by reason of promised medical support and the increased price of their milk, to conduct their dairies and handle the product in conformity with the code of requirements made by the aforesaid medical milk commission and imposed by it in due and legal form.

3. That the duties of the commission shall be, first, to establish correct clinical standards of purity for cows' milk; second, to be responsible for a periodical and personal inspection of the dairy or dairies under its patronage; third, to provide for bi-monthly expert examinations of the dairy stock by competent and approved veterinarians and a medical supervision of the employees by competent physicians; fourth, to have periodical chemical and biological examinations of the milk by well-known experts in these departments.

The requirements, or standards of purity for this milk are:

1. An absence of large numbers of microorganisms and the entire freedom of the milk from the pathogenic varieties.

2. Unvarying resistance to early fermentative changes in the milk, so that it may be kept under ordinary conditions without extraordinary care.

3. A constant nutritive value of known chemical composition and a uniform relation between the percentages of the fats, proteids, and carbohydrates.

The findings are reported to the commission, which uses them as a basis for issuing certificates to the dairy farms under its supervison.

The experts are employed by the commission, but their expense is defrayed by the dairymen.

The members of the commission shall receive no pecuniary rewards for their services, nor have any personal interest in the dairy farms.

The commission reports to the medical society at stated intervals, unless their findings show a deviation from normal conditions, when all the members of the profession are at once notified.

This, in the main, is the plan for the production of the product to which Dr. Coit has applied the term "certified milk."

On this basis, other medical milk commissions have been established in different cities throughout the United States. In 1907, through the wisdom and energy of Dr. Otto P. Geier, of Cincinnati, Ohio, a federation of the various milk commissions was formed, known as the American Association of Medical Milk Commissions, for the purpose of adopting uniform methods of procedure in their work and fixing chemical and bacteriological standards. Certified milk is a copyrighted term, limited to the use of dairymen working under the control of the properly constituted milk commission, and signifies a milk of special quality, designed for special purposes and produced under special provisions. It may then be properly defined as a milk produced under the sanitary supervision of a milk commission, appointed by a representative medical society, in accordance with definite working methods and standards of milk

purity, established by the American Association of Medical Milk Commissions.

The chief prerequisite to success in the undertaking is a reliable dairyman, one who is solicitous about his work and mentally and financially capacitated to properly execute it. The contract between the commission and dairymen should embrace ample sureties for its fulfillment and should be cordially adhered to, the commission exercising patience in enforcing its many detailed requirements and using its best endeavors to instruct the dairymen to produce the product in compliance with the prescribed regulations. The contract includes necessary forfeiture clauses and provides for the compensation of the experts employed by the commission. It determines the location and architectural design of the buildings on the plant with especial reference to facilities for drainage, to ventilation and to cleanliness. It controls the pasturage and feed produced and used, and requires an abundance of fresh, pure water, whose source is free from any probable contaminating influences. The proper housing and sheltering of the cows, their daily grooming and kind treatment are demanded. It provides for cleanliness of the stable and its freedom from animal odors by frequent removal of wasted products, forbids any live stock other than cows approved by the veterinarian within three hundred yards of the barn and milkhouse, and requires that the surroundings for any live stock other than cows within this distance be kept in a condition of cleanliness and thorough hygiene. It supervises the health of the herd, excluding any tuberculous animals and isolating any suffering with diseases which might affect the purity of the milk or jeopardize the health of the herd. It directs the collection and handling of the milk by urging cleanliness in every detail of the work, by demanding clean cows, clean, healthy attendants, clean receptacles, and a clean atmosphere. Special rules are given for cooling, bottling and sealing the milk, and for its preservation during transportation.

The commission holds bimonthly meetings which are attended by the experts, the veterinarian and the dairymen. Their reports are read and discussed and certificates are issued if warranted. The chemist reports the percentages of fats, proteins and carbohydrates, the specific gravity, temperature and reaction of the milk, and whether it has been heated or watered or contains preservatives. The frequent chemical analyses of the milk show the relative food values and aid the physicians who use the product for accurate percentage feeding of the young.

The report of the bacteriologist includes the condition in which the milk was received as to marking and sealing, its temperature and bacterial content. His work is the most essential factor in the production of certified milk. It is the sentinel on the watch tower, revealing any errors in management and guiding aright the work on the farm. He must exercise the greatest skill, precision and cleanliness lest his findings result in harm to the consumer by a too low bacterial count or an injustice be done the producer through lack of cleanliness and care in the examination.

The samples for these examinations may be taken from the distributing wagons when and where desired and the results of the examinations are mailed to the Certification Committee.

The report of the visiting physician shall embrace the number and dates of his visits, the condition of health of every employee on the plant, their hygienic condition, the quality of the water supply and general hygienic conditions of the dairy.

The veterinarian reports the physical condition of the cows, their hygienic treatment, the quality and amount of rations, the sanitary condition of the stable and surroundings, the number of animals used for certified milk, the number tested with tuberculin and the number rejected because of reaction.

The safeguards afforded by the work of the visiting physician and veterinarian are readily appreciated, inasmuch as the milk can-

not be regularly examined for scarlet fever, diphtheria, typhoid, or tuberculosis infections. Protection against these diseases from milk infection depends upon the close supervision of the employes by the visiting physician and the careful scrutiny over the health of the herd by the veterinarian.

The equipments at the farm must be so well installed and the regime of management so minutely understood and so thoroughly established as to warrant security against harmful contaminations, not only twenty-five, but thirty days of every month. To accomplish this the strictest and most skilled supervision is required, yet when the system is once properly instituted the labor is not more arduous or irksome than that required in the ordinary dairy farms which are now furnishing the city with milk. As practical tests of the keeping qualities of certified milk, it need only be mentioned that it is used on transatlantic voyages, remaining sweet throughout. It is also shipped in cold storage to foreign countries for use on return voyages. It has been taken on extended cruises in cold storage from which the daily supply is removed, and was found sweet at the end of six weeks. Certified milk of Fairfield Dairy, Caldwell, N. J., has been kept forty-five days without souring. That of the Brookside Dairy Farms, near Newburgh, N. Y., placed in the refrigerator at the dairy, was found sweet at the end of forty-three days. These are only a few evidences, among many, which could be mentioned to show its keeping qualities and to prove that milk retains its sweetness in proportion to its cleanliness and its immediate reduction to a temperature which retards or prevents the growth of bacteria.

It may be obtained by the Medical Society of Mobile County appointing a milk commission which shall draw up a set of requirements and a form of contract, and secure a suitable dairyman who will contract with proper sureties to comply therewith. In seeking a dairyman, the commission should be able to present, with the code, a pledge from every member of the medical society, and, if possible, from every physician in the city, that he will use certified milk in his own family, prescribe it in his practice, and recommend it generally. The public confidence can be had only by the support of the physicians. Endorsement and encouragement of the press will do much good along the line of educating the people as to what constitutes pure milk and what to expect from dairymen in general, bottled milk, clean milk and cold milk until delivered.

A cooperation of the various church, charitable and civic organizations of the city would be of much benefit in furthering the milk commission movement. Let us acquaint our patients and the people with the necessity of procuring clean, cold milk, unchanged by any pasteurizing, and for preserving it by cleanliness and by icing until it is ready to be used. When the laity is once enlightened as to the advantages of good clean milk and the dangers of bad milk, it will demand milk of a better quality and be willing to pay a higher price for same. Since demand for an article creates supply, dairymen will produce the quality of milk for which there is a true demand. Dirty milk is infinitely more expensive than clean milk no matter what the initial cost. Any of us here would be willing to pay a few extra cents a quart for clean milk if we had a sick baby at home. Likewise we would be willing to pay the extra cost for clean milk for the healthy baby, for it is one of the best means of keeping it well. The medical profession of Mobile is well acquainted with milk-borne morbidity and milk-borne mortality, and this phase of the question needs no elaborative consideration. In the limited time I have been in Mobile and the limited work I have done, in every instance where I have been called to see sick children, artificially fed, I have ascertained that some of the proprietary foods such as Horlick's Malted Milk, Mellin's Infant Food, Ducro's Elixir, Panpopepton or condensed milk was used as a food when cow's milk was not contraindi-

cated. The cause of this is due to the uncertainty of the cow's milk which we would be forced to use. We know the harmfulness of these proprietary preparations, yet we rightly regard them as being much safer than available cow's milk. I say this with no degree of reflection on the competency and honesty of the milk inspector or municipal sanitary officials, for, no doubt, these offcials are doing their full duty in an attempt to secure good milk and the enforcement of ordinances which prohibit the sale of unclean milk. This is the legitimate function of the committee of public health which is not, in the least, superseded by the medical milk commission, whose purpose is to enforce cleanliness throughout the production of a milk secured by voluntary cooperation between physicians and dairymen.

There were only eleven component milk commissions in the organization of the American Association of Medical Milk Commissions in 1907. Since then there have been annual meetings with substantial increase in membership. At the last meeting, which was held in St. Louis in 1910, the association was composed of sixty-eight active medical milk commissions.

It has been said that very soon few cities of over ten thousand inhabitants will be without such an organization for the encouragement of the production of clean milk. We are entitled to the best. We can have it.

MULTIPLICATION OF NAMES FOR IDENTICAL PREPARATIONS.—In an article on synthetics in the *Journal of the Michigan State Medical Society*, Dr. J. O. Schlotterbeck, Ann Arbor, says: "Suppose some genius conceived the plan of placing on the market common cane sugar under the name of 'sugarine,' and advertised it in most glowing terms as the most wonderful sweetener the world ever knew at a price of $1.10 a pound. Another, quickly recognizing the credulity of the public, exploits cane sugar as 'sweetol,' and makes additional arguments why it should be used in preference to others, and sold at 75 cents per pound. Another places 'Ducitol,' at 50 cents per pound, and finally, an honest dealer offers the same article at 5 cents per pound as 'saccharum,' or sugar. What would you think of the cook who would use several of these brands of sugar in making your pastry? An exactly similar condition exists in medicine today. The pharmacopeial synthetic hexamethylenamin is on the market today under the name urotropin, cystogen, aminoformin, formin, uritone, urisol, cystamin and so on, at prices ranging from 10 cents to $1.10 per ounce. It is not uncommon for physicians to prescribe one or more of these fancy-named, but identical synthetics in the same mixture, expecting to get the combined action of different urinary antiseptics. It is also true that patients have been treated first with hexamethylenamin under one name and then with the same article under another name, in the expectation that looked-for results will finally manifest themselves.

"By prescribing hexamethylenamin, the physician receives an article that is uniform and whose purity and quality can be controlled by the tests of the Pharmacopeia. Besides that, he is then not a party to the fostering of a graft, which is possible by prescribing the same article under a fancy registered name and sold at a price ten-fold greater than the pharmacopeial article. Surely no physician wishes to inflict an unnecessary hardship on himself, or pharmacist or patient."—*From the Journal A. M. A., January* 19, 1907, *p.* 241.

Comment is unnecessary. But of course no reader of THE SOUTHERN MEDICAL JOURNAL could be guilty of such assininity.

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Next Meeting Hattiesburg, Miss., November 11-13, 1911.

Dr. J. H. Honan

Many of our readers who have studied in Germany will recall with pleasure the figure of Dr. J. H. Honan, for years President of the Anglo-American Medical Society at Berlin. One of the editors of this JOURNAL had the pleasure of his acquaintance in that city, and it was therefore with real delight that he recognized Dr. Honan as the author of an important paper, "Carbonic Acid Baths in the Treatment of Heart Disease," read at the Nashville meeting of the Southern Medical Association.

The paper appears in another part of this JOURNAL and will be appreciated as the expression of an opinion concerning a therapeutic measure not yet generally adopted, by one who has acquired a master's knowledge by experience at the place of its origin.

From every point of view, therapeutic, clinical, historical and literary the paper is one of great interest and importance. Few physicians who once begin to read it will willingly lay it down until the last word is read.

Vivisection

No humane man or woman worthy to tread this beautiful earth can fail to shudder at the horrors of vivisection as depicted in the multitudinous circulars and leaflets so widely distributed by the New York Anti-vivisection Society. If the infamies they charge against medical investigators as perpetrated in their laboratories were even partly true, nothing less savage than summary lynching would be too bad punishment for their atrocious cruelty.

To bolster up their wild assertions they quote the names of men whom they claim are eminent phsicians whose opinions and feelings correspond with their own. Good men and women, to whom no special sources of opposing information are open, naturally accept the testimony of their "eminent physicians" as conclusive, and condemn animal experimenta-

tion as wholly merciless and vile. But when a doctor reads these charges, and sees the names of "eminent physicians" supposed to support them, he naturally turns to medical records of various kinds to see who these gentlemen are and how they stand in the estimation of their fellow citizens.

When he does so a queer smile sweeps irresistibly over his features, for the list of "eminent physicians" resolves itself into three classes: first, men born before the days of chloroform, some more than a century ago, who had not the remotest conception of modern facilities for painless work; second, incorrigible cranks who never saw an experimental operation, who make no claim to being regular physicians, but are Theosophists, Christian Scientists, raw fruitists, novelists, poetists, *et id omne genus;* and, third, doctors of medicine so obscure that no record or statement of them or their professional standing can be obtained. A fine roster this to offset Gross, Flexner and the hundreds of "eminent physicians" of our own day and time whose names are household words wherever civilization brightens human life! Then the untruthful statements, refuted again and again, but yet again published to be read by those who will never read the refutation, indicate desperate resolve to stick to their story through thick and thin, never hinting at the countless lives of human beings and animals saved or comforted by knowledge gained by painless sacrifice of a few dumb animals, sacrificed in ways far less rude, torturing and shocking than those that prelude the anti-vivisectionists daily meals. Why this persistence in the face of truth and right? What is the mainspring of all ones pretended love of beasts beyond ones love of mankind? There must be a reason, a big reason, for the activity is widespread and persistent. Do the promoters expect rewards in the next world or in this? Golden slippers hereafter or golden eagles here? Well! One can make a guess, for printing presses and paper, clerk hire and postage stamps are not often used to bolster up an egregious falsehood by repeating refuted and stale untruths, unless there is something in it. We must not muzzle the ox that treads out the corn from the straw, and the animals that continue to thresh over such mouldy, musty, rotten straw as the stock in trade of the New York Anti-Vivisection Society probably have wide open mouths and no muzzles. At any rate, we know the truth has failed to muzzle them. So—what's the use, anyhow!

"Health on Wheels."

Dr. Oscar Dowling, appointed President of the Louisiana State Board of Health last September, inaugurated on November 5 the most unique health campaign on record.

Mr. Orville T. Bright, of Chicago, after a visit to the train on his way home from Mobile, said, "It is the most amazing enterprise I have seen in the South."

Largely through the good will of Dr. Dowling's personal friends and friends of the members of the Board, on November 5, a Train—Health Exhibit Train, it is called—was put on the road to teach objectively the lesson of disease prevention.

There are three coaches, one a Pullman owned by the Board of Health, called "Education and Inspection Car," and used by the doctors, instructors and office force as a living car. It was given to the Board and the interior was designed by Dr. Dowling. When the tour of the State is finished this car will be used by the members of the Department of Health for inspection trips and to visit points where infectious diseases prevail.

The second Pullman, loaned through the courtesy of Mr. D. D. Curran, President and General Manager of the Queen & Crescent Route, is filled with anatomical and pathological, pure food, oral hygiene, exhibits, and many other suggestive displays, all teaching objectively some lesson in disease prevention.

The third small car, loaned through the good will of Mr. H. B. Hearn, Superintendent of the V. S. & P., is filled with models of utili-

ties—model dairy, slaughter house, etc., model school furniture and miniature "plants" such as are needed in cities for ice, water, sewage disposal, etc.

The plan of work is to have time of arrival advertised through local physicians, boards of health, the principals of schools, and other public-spirited men and women.

On arrival, the school is visited and instructions in personal hygiene given the children; a lecture for the ladies follows and at night a program of illustrated lectures, with moving pictures, is given. The exhibit car advertises itself as rumors amusing and farfetched precede the arrival of the train. The "free" moving picture show and reports of inspections draw crowds for the evening program.

The most effective feature of the work is "inspection." When the train stops, long before it is "switched," Dr. Dowling with yard stick in hand, is "off" to inspect. Dairies, markets, slaughter-houses, bakeries, all places where food products are prepared or sold; jails, court-houses, all public buildings; the water supply, drainage, sewage system; in fact, everything pertaining to clean food and sanitary conditions is investigated.

The doctor has an all-seeing eye, nothing escapes him; he "lays down the Code" with impartial justice and firmness, yet with such kindliness that the men whose places of business are criticized, or even condemned, feel no resentment. In the absence of Dr. Dowling, Dr. S. D. Porter, State Sanitarian, does the inspection work. The condition of the places from which food products are procured, is a revelation to the citizens of the communities. That bakeries, markets, slaughter pens, oftener than otherwise, are positively dirty with accumulations of trash, unscreened and with a most untidy working force seems incredible to the average consumer. Health officers acknowledge that they have never visited any place where food is prepared for sale; housekeepers say they had never thought of visiting a dairy or bakery. The awakening is not pleasant, but having once had these conditions shown, it is a local problem to enforce the rules of the Sanitary Code.

This first tour is educational. It is the desire of the Board of Health to promulgate the law, to show to the producers that their places are not up to the requirement of the Code, to inspire communities to appoint trained men as health inspectors, and pay them sufficient salaries to do the work well.

The second tour will mean enforcement of the law. An official score will be made and those who are not meeting the requirements of the law will be forced to do so within a given time; if warned before and no improvement is shown their places of business will be summarily closed.

The departments of work represented by the force on the train are inspections which includes instruction in general sanitation; investigations and lectures on hookworm disease; istruction in school and home hygiene; laboratory investigations and examinations as to quality of foods.

The present associates of Dr. Dowling in this work are: Dr. Sidney D. Porter, State Sanitarian and Director for Rockefeller Hookworm Commission; Dr. Victor F. Carey, who has charge of the laboratory and exhibit car; Miss Agnes Morris, organizer of School Improvement Leagues for the State Department of Education, and instructor in School and Home Hygiene for the Board of Health, and Miss Fannie B. Nelken secretary and correspondent; Dr. A. S. J. Hyde, Dr. Thomas E. Wright, Dr. H. P. Jones, Dr. P. T. Talbot, Dr. E. L. Sanderson and others have been from time to time at work on the train, as there is needed always a larger force than those who permanently do the work.

"This is our wash day." "We are going to clean the State," Dr. Dowling often says, but he realizes that it will take continued and persistent effort to accomplish the desired end. However, this trip already has paid for itself, both the money and expenditure of effort.

The 140 towns visited so far have with few

exceptions "cleaned up." Cities and towns formerly without health officers or Boards of Health have had them appointed. Many markets and dairies have been screened, women's civic leagues have been organized to aid in this campaign for clean food and clean streets, and there is an appreciative awakening on the part of many city authorities and public-spirited men and women as to the necessity for united effort for better health conditions.

The success of the work is very largely due to the enthusiasm, judgment, intelligent direction and energy of Dr. Dowling. He inspires everyone around him to labor unceasingly and unselfishly, and commands the respect of all because of the scope of his ability and the genuineness of his humanitarian motives.

Ask Questions!

It is a safe assertion that the man who thinks he knows it all is egregiously mistaken. It is also true that he who dares not ask necessary questions, lest he be thought uninformed, lacks moral courage and misses much.

These statements are especially true when applied to the busy doctor's condition and requirements. He has neither the money to buy nor the leisure to explore the multitude of medical books and journals that could enlighten him in matters wherein he is in doubt, but if he could only turn to his fellow doctors who are working under similar conditions and ask them what conclusions their experience has led them to adopt regarding the points that perplex him, he would receive reliable information based upon clinical experience, and upon which he could act with confidence.

"Have you prescribed phenolphthalein, and in what dosage and combination, and how do you like it, doctor?"

"Do you use digalen hypodermically, and if so, what results, favorable or unfavorable, do you get, doctor,"

"Do you find all the preparations from the suprarenal glands, such as adrenalin, suprapcapsulin, etc., equally effectual, and how do you use them?"

Such questions and many more like them it would be a delight to discus informally with friendly members of the professional brotherhood.

Well, the JOURNAL offers you, not your friends, but you yourself, doctor, an opportunity to thus informally consult with over 4,000 other doctors.

Send your perplexities to the editors of the JOURNAL and they shall be placed before its readers and the answers published for the general good. If you are too modest (but we hope not) to allow your name to be printed in full along with your questions, we promise to preserve your incognito if you so request. Of course we must know you when writing us, but that is not the business of anybody else.

So come on with your perplexities and queries, doctor, whether of etiology, diagnosis, therapeutics or treatment, and out of the thousands who will read them surely some one will be able to answer you satisfactorily.

Encouragement of the Nostrum Evil by "Reputable" Physicians

To the Editor:—Permit me to ask a question. Why is it that medical men of repute will write articles for so-called medical periodicals whose advertising pages are reeking with advertisements of the worst nostrums, the very kind that the presumed leaders of the profession have set their faces against? I have before me a sample copy of such a periodical making a specialty of surgery. The leading article is written by an eminent surgeon of Baltimore who specializes in gynecology. What are we to think about such doings? If he is of the rank and file that fight the nostrum evil, why does he not write only for such periodicals as have taken up this fight?

A. E. CONTER, M.D.

Apalachicola, Fla.

(COMMENT.—We do not know why reputable physicians will write for such medical journals as those described by our correspond-

ent. Probably for the same reason that equally reputable men will allow their names to appear as "associate editors" or "collaborators" in connection with the same kind of journals. The most disheartening phase of the fight for decency and truthfulness in medical advertising is the apparent indifference, on the part of many physicians of high standing, to the character of the advertising found in medical journals for which they subscribe and to which they contribute. As has been stated time and again in the *Journal*, if physicians would insist that the journals they patronize shall be as clean in their advertising pages as they are in their editorial pages, the evils connected with the "proprietary" business would be solved in six months. So long as the leading members of the medical profession give financial support—as subscribers—and moral support—as contributors—to those medical journals whose advertising pages are a disgrace to medicine, so long will the great American fraud—as it relates to the medical profession—flourish. So long, too, will these journals that are trying to be decent labor under a grievous disadvantage. —EDITOR.—*Journal A. M. A.*

The above is what the editor of the *Journal of the American Medical Association* has to say in answer to the letter of Dr. Conter.

We do not think the subject is much enlightened by saying that doctors do this and that for the same reason that other doctors just as good do so and so. But what is that reason? If one stands aside and tries to play the part of an absolutely disinterested spectator he gets some odd side lights on the question. The celebrated Dr. Magnograph reads an interesting article on his own specialty by Prof. Redum Allsuh in the Touch-'em-light Medical Journal, a journal with lots of original articles and extracts, and more pages of advertisements than of reading matter, but no editorials to speak of. Next month Dr. Magnograph and another professional competitor have "original articles" in the "Touch-'em-light," interspersed with pretentious "reading notices" of Cantikammyher and Compound Extract of Dibenzoate of Hydrogen Honey" for coughs, etc. But there are their articles, and there they will continue to be, crowded in with advertisements of unethical compounds, many of which they use themselves on account of a faith engendered by familiarity. They see the glowing advertisements thereof every time they smile complacently over their own or glower disgustedly over the papers of their unloved competitors.

> Fake nostrums are of such a hideous mien
> To be condemned they have but to be seen,
> But seen too oft in advertising space
> We first peruse, then try, to our disgrace.
> *And there you are!*

The remedy? That's easy. Get up another society, an anti-contributing society whose members will not send contributions or subscribe to any medical journals that carry advertisements of preparations absolutely condemned by the A. M. A. Council on Chemistry and Pharmacy. Though that might be an illegal boycott, if put down on paper, yet any man can carry as many boycotts in his head —and heart—as he cares to.

The Canal Zone and Sanitation

In these days of fresh air and out-of-door treatment, men who fear their lungs may be harboring the B. tuberculosis sometimes imagine that if they could find employment in "the zone," where the temperature always demands free circulation of air day and night, they could combine profit and cure in a manner satisfactory to Uncle Sam and profitable to themselves. To such persons the JOURNAL recommends a perusal of the following abstract clipped from the *Canal Record* of January 11, 1911:

"Notice to Employes.

"Employes of the Commission and Panama Railroad Company on the Isthmus are instructed not to advise friends in the States to come to Panama in the hope of procuring employment on the canal, or railroad forces. Persons wishing employment on the Isthmus should make application to the Washington

office, and take their turn on the registers. No one can be sure of employment unless he is sent here by the Washington office, and preference is given to applicants through the employment agencies in the States."

The following clipping speaks so calmly of large sanitary operations that it almost takes the breath of health officers in towns where their pathetic requests for one man and a can of coal oil to kill the potential malarial mosquito in the public ditches meets with an indignant refusal:

"Sanitary conditions continue to improve. A total of 6,939 linear feet of new ditches was dug, 25,500 square yards of pools were oiled, and 2,800 water receptacles were destroyed during December."

Careful analysis of certain tables of figures published by the Canal *Record*, December 21, 1910, enables one to reach a fairly intelligent estimate of the cost of the Department of Sanitation as compared to the aggregate of all the other departments. The actual measures of sanitation cost only a fraction of the amount charged to the Department of Sanitation amounting to less than one cent a day per capita of the persons thus protected.

The entire expenditure, exclusive of the Department of Sanitation up to June 30, 1910, omitting odd cents, was $151,072,250.00. Cost of the Department of Sanitation to that date, $9,673,539.00, or one dollar to about every $16.78. This, of course, included cost of inaugurating, organizing, building hospitals, etc.

During the month of October, 1910, the last given in this report, the comparative expenses figure out very close to one dollar for the Department of Sanitation to every twenty dollars expended on all the other departments combined, namely, Civil Administration, Construction and Engineering, and "General Items," the latter class amounting to twice that of the Department of Sanitation in expenditures. Five per cent is a very reasonable figure for Uncle Sam to pay for the life insurance of his canal workers, especially as the experience of the French engineers shows that without it all his other millions would be spent in vain.

But this five per cent has paid for something even more valuable than the lives of his workmen and the certainty of the canal.

It has subjected to human endeavor, guided by human intellect, some of the most malign potencies of nature, hitherto deemed invincible, and has recorded a promise that the day will come when yellow fever and malaria will exist only in history. Surely the money expended by the Department of Sanitation of the Panama Canal Zone is a good investment for our country and for all humanity.

The February number of this JOURNAL was devoted chiefly to the consideration of papers read before the American Society of Tropical Medicine. The Gulf States are the Southern door-steps of the United States over which tropical diseases pass to enter the country. Hence the continued interest in tropical medicine manifested by THE SOUTHERN MEDICAL JOURNAL.

CORRESPONDENCE

FRAUD.

The following letter is worthy of your attention:

PLANT CITY, FLA., February 13, 1911.

Editors Southern Medical Journal:

Please give space to the following *warning.* Mr. D. N. Ingraham (general agent for all magazines), of 167 Central Avenue, Atlanta, Ga., is a *fraud,* and is not an authorized agent of some of the leading magazines, as the enclosed will show. Said Mr. Ingraham has swindled me out of eleven dollars for magazine renewals. I paid him the money December 17, 1910, and now my magazines have all stopped and the publishers claim my subscriptions have not been renewed. I hope if said party tries to swindle another member of the profession he will have him arrested.

Very truly yours,

J. W. ALSOBROOK.

MYIASIS.

GRAND BAY, ALA., January, 1911.

Southern Medical Journal, Mobile, Ala.

MESSRS. EDITOR::—Below I submit the clinical history of a very interesting case under my care, and will thank you for giving the same your consideration.

Patient, white, female, age 8 years, intelligent, healthful and strong, but slender. Personal history negative; never treated by a physician.

In March, 1910, a younger brother developed what seemed to be diphtheria and was injected with 7600 units Mulford's diphtheria antitoxin.

This patient, now under consideration, received 500 units as an immunizing dose. No untoward symptoms followed.

About two months later there appeared what seems from description to have been a large urticarial wheal on lower right abdominal region. It itched but was not sensitive to pressure. Not seen by physician. Since that time there have appeared between shoulders, on neck, cheek, scalp, and at various places similar elevations. They last from several hours to several days. Sometime ago they appeared around the eye and then disappeared.

About ten days ago the patient was brought to me with left eye entirely closed, both lids being puffed and pinkish to purplish in color. When the lids were forcibly separated the eyeball appeared normal.

Prescribed laxative, syrup Ferri iodidi, and painted lids with tinct. iodine.

The swelling soon left the lids but appeared first on the scalp and next on the neck. It vanished within a day or two. The mother claims to have noticed a slight abrasion or orifice in the eyebrow when at my office ten days ago, but I failed to see it.

I noticed a swelling of the same eye yesterday.

The mother, seeing an orifice this morning, with a needle extracted the larger specimen of larva, which I send you. This afternoon they brought her to me, and noticing an elevation and orifice on the scalp precisely similar to the "warbles" or "wolves" seen in the backs of cattle, I extracted the smaller specimen, which I send you.

My impression is that these two lesions indicate what Pusey terms "Myiasis." I suppose that some fly found these two favorable points and deposited the eggs that produced the larvae.

A number of questions suggest themselves to me:

1. Is there any connection between the injection of the antitoxin and the subsequent oedematous enlargements?

2. Were the swellings on various parts of the body all caused by larvae, or were larvae deposited in two only of the swelled areas?

3. Were these larvae antecedent, causative, contributory, accidental, or subsequent factors?

4. What will probably be the course of the trouble now and what prognosis?

5. What treatment should be instituted?

6. What is the name, habits and history of the fly, if fly it be, that laid the eggs from which these larvae hatched?

Sincerely,

M. A. FORT, *M.D.*

MOBILE, ALA., February 9, 1911.

Dr. M. A. Fort, Grand Bay, Ala.

MY DEAR DOCTOR:—The graphic description you have written of your very unusual and interesting case points unerringly at your diagnosis of "myiasis," and the specimen larvae you forwarded with your clinical account of the case confirm that diagnosis beyond the shadow of a doubt. They are perfect larvae of the green blow fly technically known as Lucilia Macellaria, the larva being commonly called the "screw worm," from the fact that certain elevated, spiny, spiral shaped, interrupted or broken rings around the body, seven in number, suggest the threads of a screw. Their origin is without doubt the ovipositor of the female Lucilia Macellaria, or common bluebottle fly so common in warm climates, especially about excavations, cellars or fresh earth. Though apparently clumsy, their deposit of eggs is swift and almost instantaneous. They select wounds or abrasions as a rule, but sometimes deposit their eggs in the nostrils or ears under favorable circumstances, when the ravages of the migrating larvae quickly cause excruciating pain and may result fatally, by boring into the frontal and ethmoidal sinuses, and sometimes reaching the brain.

Once hatched they are very active and destructive to tissues. In your patient the fly evidently attacked an abrasion caused by scratching an urticarial wheal to relieve intense itching. Under the loose skin of the forehead and scalp the worms would have no difficulty in burrowing from place to place, and wherever they came to the surface, thereby breaking the skin, it was an invitation to further infection by any waiting fly.

The larvae themselves cannot multiply in the tissues. If but one egg is laid, there will be but one worm, but reinfection is very possible where there are the proper environments and the green flies. When discovered by you and removed they may or may not have been in their original positions, as they were situated very favorably for migration. Now to answer your questions seriatim: 1. "Is there any connection between the injection of diphtheria antitoxin and the subsequent oedematous enlargements?" Answer: Probably; Edwards mentions, among sequels to the injections, general urticaria after one or two weeks, and in "very severe cases" oedema of the skin and pharynx, etc. 2. "Were swelling on various parts of the body all caused by larvae, or were larvae deposited in only two of the swelled places?" Answer: Probably in only two places. Perhaps in only one place, whence they burrowed independently; and on the other hand there might be more than two larvae. 3. "Were these larvae antecedent, causative, contributory, accidental or subsequent factors?" Answer: Accidental and contributory. 4. "What will probably be the course of the trouble now, and what is the prognosis?" Answer: If other larvae are present they will manifest their presence by small tumors probably with summit punctures, such openings rendering the larvae subject to medical and surgical attention. The prognosis is entirely favorable if the larvae have not invaded the internal nasal tissues or those of the ear, in which case it would be very grave. 5. "What treatment should be instituted?" Answer: Prophylaxis, by protecting abraded surfaces from the attacks of the fly. A very weak solution of carbolic acid, one drop to the ounce of water, on cloths over wounds will repel them. Removal of the larvae when found. So long as they are alive their spiral rings of spines render it very difficult to draw them out of their burrows; but as soon as they are killed by an injection of a drop of chloroform or phenol, the slightest pull of the forceps will remove them. 6. "What is the name, history and what are the habits of the fly, if fly it be, that laid the eggs from which these larvae were hatched?" Answer: The

technical name of the fly is Lucilia Macellaris. It is the common green fly, or flesh fly, seen haunting cool, damp, shady spots in hot weather, especially around cellars or newly excavated earth. They are sometimes seen near newly-dug graves, and the ignorant believe it is because of a knowledge of their use. They will breed in any moist, decaying animal matter, but prefer flesh. Though apparently clumsy in their movements, they deposit their eggs so quickly and deftly as to often escape observation. They breed with prodigious rapidity under favoring circumstances. We have somewhere seen a statement that the progeny of one female, hatching and producing a second and third generation, and soon unchecked, each successive crop of eggs, numbering thousands, would devour the carcass of a horse in three days. Whether or not this be true, the fact remains that they do infect the living human flesh sometimes, and that this infection may become painful, dangerous and even fatal.

We hope the foregoing information is sufficient and satisfactory. We have thought that perhaps other physicians who read THE SOUTHERN MEDICAL JOURNAL might be interested in this unusual case, and therefore request your permission to publish your clinical account and this reply to your queries. If you have no objection to this course please notify us.

Very respectfully,

THE EDITORS.

A letter from Dr. Fort, dated March 22, reports that no urticaria or other symptoms of myiasis have appeared since the date of removal of second larvae in January.—EDS.

BOOK REVIEWS.

TRANSACTIONS OF THE FOURTH INTERNATIONAL SANITARY CONFERENCE OF THE AMERICAN REPUBLICS. Held in San Jose, Costa Rica, Dec. 25, 1909 to Jan. 3, 1910.

The neatly printed and bound book with the above title comes to this office for review, and inspection shows that it is eminently worth reading. Also no one who is at all interested in general sanitation can afford not to possess a copy, for it is full of interesting information. The following items are gleaned at random just to give our readers an idea of its character.

The State of Colombia, South America, is credited with a population of about five millions. The number of lepers in the country is authoritatively reported as 4,639. Over 50 per cent of these acknowledged lepers "are isolated in the various lazarettos." Dr. Martin Amador, delegate from Colombia expressed great confidence in the ability of his government "to control and eradicate the scourge, as several of the European nations have been able to do, by isolation."

The delegation from Costa Rica presented an interesting report. That relating to Limon is of chief practical interest to us because of our maritime commerce and frequent communication with that port. "The majority of the inhabitants are Jamaica negroes, tramp laborers from the West Indies," and similar elements of population. Men preponderate. The highest point is nine feet above sea level. Some buildings stand on land made by filling low, undrained spots with garbage, but sanitation is perfect.

The previous convention at Washington provided to exclude plague, cholera and yellow fever only. An "immigration law" of Mexico protects that country against the entrance of the three diseases above mentioned, and also cerebro-spinal meningitis, typhoid fever, exanthematic typhus, diphtheria or any other acute disease which the executive may consider transferable.

It also prohibits the admission of any person suffering from tuberculosis, leprosy, beri-beri, trachoma, Egyptian mange, or any other chronic disease that the executive may consider transmissible.

The public health systems of some of these small republics present a comprehensiveness of organization, a perfection of detail and an energy of administration that may well serve as models for larger, stronger and richer states.

A COMPEND OF THE ACTIVE PRINCIPLES, With Symptomatic Indications for Their Therapeutic Use. By Harold Hamilton Redfield, A.B., M.D. Clinic Publishing Co., Chicago.

This is a little book in size and thickness. Whether or not it is small in character the reviewer feels incompetent to decide.

When he wandered among the earlier pages trying to appreciate their refinements of therapeutic indication he finally came across the following remark concerning bryonin: "In contradistinction to anemonin, which finds its best field of usefulness among blonds, bryonin seems to be especially indicated in brunettes." Then the reviewer had to stop to think. How would the alkaloid, or glucoside, work in persons of color? Would it be more effectual in those whose undiluted African descent is demonstrated by a concentration of brunetteism equivalent to blackism? Or would a good ginger

cake color cause the brunette reaction? To Southern doctors this is a vital question, and the book does not lucidly answer it. He suggests giving caffeine to cases of "insomnia when the mind is flooded with ideas and the sufferer lies awake through the night," etc. Why, of course! A cup of strong coffee strikes every one as a sensible remedy for sleeplessness, now that our author has suggested caffeine. A few more gems from this collection are the following:

"Cicutine is indicated in diseases of old men and old maids."

Whether it removes desire or renews youth is not stated.

"One of the cardinal indications for caupophyllin is heaviness and drooping of the eyelids, the patient cannot keep the eyes open, and the lids must be raised with the finger. There are also moth patches on the face."

This remarkable condition is relieved by 1-6 grain of the remedy, though the number of doses and the intervals between them is not specified. This is indeed unfortunate.

The chief indication for colocynthin, the active principle of colocynth, is, "when the sciatic and crural nerves are involved" feeling as though "the bones forming the joint were being screwed together." Colchicine "expels the leukocites from the circulation, collecting them in the bone marrow." Helonin. Dose of the standard granule 1-6 of a grain. "Indicated when the external genitals in the female itch constantly." Is the drug to be taken internally or locally applied with gentle friction?

The foregoing samples tell the tale. The drugs mentioned are recommended for other conditions also, but the quotations are about correct.

STATE BOARD EXAMINATION QUESTIONS AND ANSWERS of Forty-one States and Two Canadian Provinces. Third Edition, Revised and Greatly Enlarged. New York. William Wood & Company, 1910.

The plan of this book is simple, but comprehensive. First, it gives questions that have been actually submitted for candidates for examination before State Medical Examining Boards, arranging them properly under heads, such as Anatomy, Physiology, and so on, through the list of subjects. Then follows, after the questions of the State Boards, a liberal space devoted to answering the questions.

It seems to the reviewer that a person with ever so good a memory would have to devote a long, arduous period to study of these questions and answers before he could acquire the requisite knowledge to pass successfully any one of the searching examinations detailed in the book. But it must be remembered that these are not forms for future work, but merely records of work over and done with, and that each Board will be careful not to play into any "crammer's" hands by sending out questions duplicating any others. They will be new questions whenever possible. However, any candidate for license to practice medicine who, without having previously studied the various branches, can pass successfully the gauntlet of the queries presented in this collection, ought to receive his papers. Such an instance would occur only once in a century, and would demonstrate a mind and memory superior to ordinary obstacles.

Nevertheless, if the reviewer had to go before a State Board for an examination on the subjects of medicine and surgery he would certainly secure this book and study it faithfully. It would help wonderfully to refresh the memory.

MALARIA. By J. H. McCurry, M.D. Press of S. C. Toof & Co. Memphis, Tenn.

This book, though a very small one, claims to give "the most thorough and exhaustive methods of treatment of any work of its kind on the subject"—truly a broad claim. Upon examination, the reader will find many items of interest and much practical instruction concerning the management of malarial cases.

Dr. McCurry lives where clinical study of malarial patients is a daily duty, and he has evidently availed himself of the opportunity, adding to the aforesaid clinical study an acquaintance with the works of some of the foremost writers upon the subject.

Concerning the inunction of quinine, he speaks very convincingly, condemning the slow, uncertain, messy quinine and lard mixture unconditionally. In its place he recommends a solution of bisulphate of quinine in glycerine. The glycerine, he says, readily penetrates the skin and carries the quinine with it. Consequently the huge amount wasted with the lard mixture would be too massive dosage for infants through whose skins the glycerine mixture is to be rubbed. Sulphate of quinine will not dissolve in glycerine, hence the bisulphate is specified, being perfectly taken up by it. Dr. McCurry gives the credit for originating this valuable improvement to Dr. George E. Pettey, of Memphis. This little piece of practicality is alone worth the price of the book to one not previously knowing it.

Our author is also evidently a disciple of the so-called alkaloidal cult, speaking very favorably of berberine, aconitine, ceratrine, quinine arsenate, quinine hydroferrocyanide, etc., but the foundation of his treatment is the old and standard C. P. Q.—calomel, podophyllin and quinine.

THE TREATMENT OF SYPHILIS BY THE EHRLICH-HATA REMEDY. By Dr. Johannes Bresler, Chief Physician to the Provincial Medical Establishment at Luben, Silesia. Second Edition. Much Enlarged. Translated by Dr. M. D. Eder. Published by the Rebman Company, New York. Price, $1.00.

This is a book of about 125 pages, neatly printed and bound. It is adorned with excellent portraits of Ehrlich and Schaudin.

The text conveys all that Ehrlich and his colaborers had to say about salvarsan up to October, 1910.

Though experimentation with the remedy has been actively pushed all over the civilized world since that dtae, yet every physician interested in the class of work to which it pertains—and who is not?—will be better equipped for genito-urinary practice if he has this book than he can possibly be without it. The book is written from a clinical standpoint, and recounts case after case, with results. Various forms of technique are specified. The place of election for injections seems to be the sub-mammary in women, the suprascapular angle in men.

No attempt is made to obscure the fact of painful results often experienced at the site of puncture.

Tachycardia and fever are noted (in 102). The results in 33 cases of malaria are mentioned. This phase is very interesting to physicians in semi-tropical regions. Nine grains "sufficed to cause the disappearance of the parasites from the peripheral blood ni tertian fever within twenty-four hours. In tropical malaria the parasites disappeared in half the cases, but generally reappeared within a few days, when the fever returnd." Apparently it would be useful in very severe forms of malarial infection, which prove refractory to mercury and quinine.

The item of latest date is of October 31, 1910. It describes the work of Professor Treupel, at Frankfort. It relates to syphilis of the nervous system, of which he has treated forty cases. "In ten cases of general paralysis there was no improvement."

TREATISE ON DISEASES OF THE SKIN.

By Henry W. Stelwagon, M.D., Ph.D. Sixth Edition. Thoroughly Revised. 289 Illustrations in the Text and 34 full-page Colored and Half-Tone Plates. Philadelphia and London, W. B. Saunders Co.

This monumental work by a specialist whose name is known wherever either of the six languages in which science has a place is spoken, has achieved a wonderful demand. Think of it! It was published in 1902, again in 1903, once more in 1904, revised, reprinted and recopyrighted in 1905, reprinted in 1906, again in 1907, 1908, 1909, and revised, recopyrighted and reprinted in 1910. Very possibly other text-books may have made a similar record, but the attention of this reviewer has not been directed thereto. An inspection of its eleven hundred and ninety-five pages, even though that inspection be of the most cursory character, promptly reveals the cause of this phenomenal popularity with both under and postgraduates in medicine and dermatology. The reason is, there is nothing omitted, it is all there. No pathological condition of the skin, old or new, foreign or domestic, escapes careful, minute, practical attention. Whenever a diagram, sketch or engraving can emphasize or clarify a description, it is provided.

Conditions now of unusual interest receive appropriate attention, so that pellagra, tuberculosis verrucosa and blastomycosis are made duly prominent and finely illustrated.

Several newly-discovered or lately-understood conditions are presented, such as sporotrichosis gangosa. The illustrations are really remarkable for their excellence and number. Many of them are full-page "insets" on heavy, glazed paper, worthy of framing behind glass.

The illustrations of variola, for instance, lack only color, such as is shown facing page 774, to be startlingly realistic.

On page 1135 are illustrations of the microscopic insects known as pediculoides ventricosus, the cause of a condition popularly known as "straw-itch," "grain-itch," "mattress-itch," etc. Three specimens are shown, Mr. P.-v., Miss P. v., and the gravid Mrs. P. v. How the different members of the family recognize each other passeth understanding, as they resemble each other about as much as a mud turtle resembles a gooseberry. However their mutual recognition is attested by the rearing of large families. They are easily destroyed when once recognized.

Nothing connected with diseases of the skin escapes the observation of Stelwagon, and whatever he observes he notes, considers, elucidates, and describes with a clearness and accuracy all his own.

The book is already a classic.

BACTERIOLOGY AND SURGICAL TECHNIC FOR NURSES.

By Emily M. A. Storey, Superintendent Training School for Nurses, St. Anthony's Hospital, Rock Island, Ill. Third Edition. Thoroughly Revised and Enlarged by Frederic Richardson Griffith, M.D. (University of Pennsylvania), Surgeon, Fellow of New York Academy of Medicine. Illustrated. Philadelphia and London. W. B. Saunders Company, 1910.

It is a trite saying that the nursing of a patient is of more importance than the prescribing of the medicine he shall take. This is doubly true of the surgical patient.

The success of an operation nowadays depends upon the surgeon, his assistants, and the subsequent attendants preventing pathogenic bacteria from gaining admission to the wound made by the surgeons or by disease.

All of which is an argument proving that a nurse who undertakes to carry the surgical patient through the days following an operation, in such a manner that no infecting "germ" shall have any chance to slip in anywhere, should be thoroughly educated as to the peculiarities, habits, growth, manner of propagation, and ways of entrance and attack of such foes to recovery. The aim and object of this little book is thus to educate the nurse of surgical patients. At the first blush it does not seem that a book of three hundred pages would be needed to teach a womanly woman, even if she be a "trained nurse," how to keep herself, her appurtenances, and her patient's person and appurtenances *clean*, and free from any sort of "matter in the wrong place." But one who reads this book, of which a third edition is demanded, will soon dispense with that idea. One experiment, by the well known investigator, Darling, of Harvard Medical School, opens our eyes to the difficulty of absolute asepsis. An abdominal operation was performed in an operating room as clean as soap and water could make it. Four Petri dishes standing in different parts of the room and containing sterilized and coagulated blood serum, were uncovered at the moment when the knife penetrated the skin. At the close of the operation the plates were covered, carried to the laboratory, and incubated at 37 degrees C.. In 24 to 72 hours all developed colonies, some of which were staphylococci. The plate on the patient's knees, a few inches from the open abdomen, contained fifteen colonies of Staphylococcus albus and three colonies of S. aureus! Such a demonstration certainly affords abundant food for reflection.

Other parts of the book are profusely illustrated with sketches of instruments, bandages in position, application, apparatus, clothing, etc.

In fact there can be but little practical work to be done by a nurse that is not detailed here.

To complete the work quite a useful line of diet is described with full instructions for its preparation.

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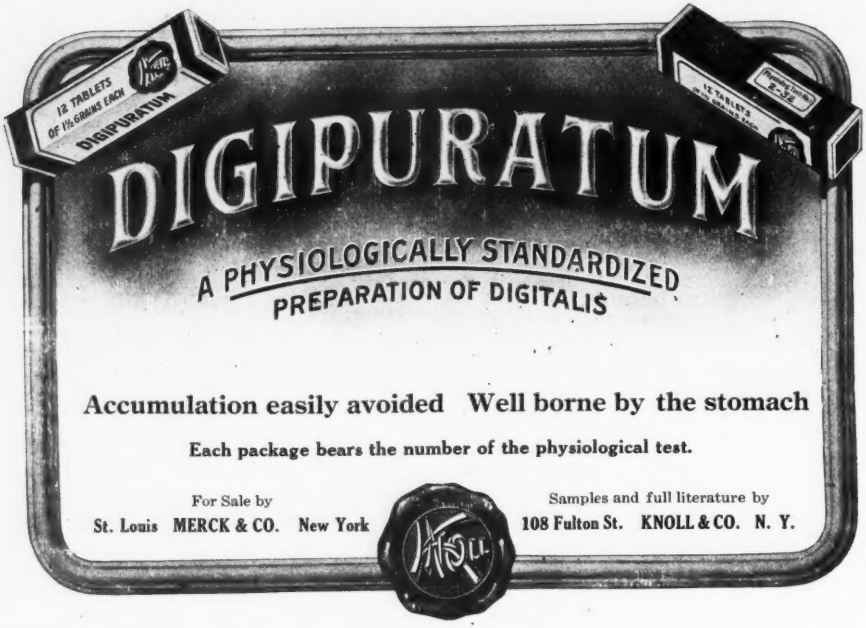
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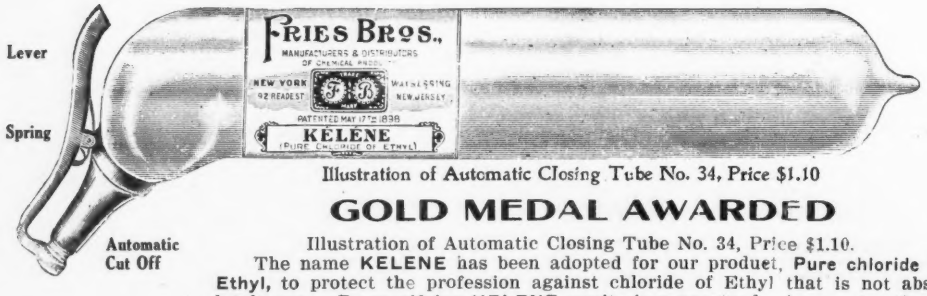

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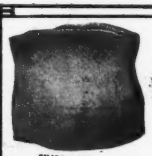
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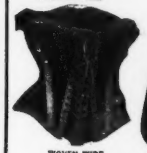
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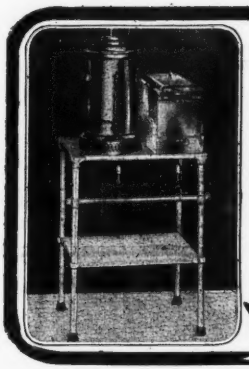

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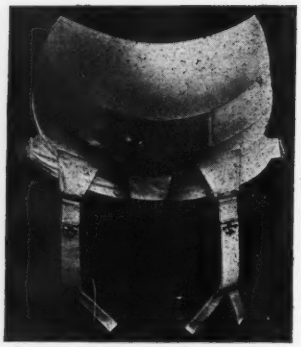

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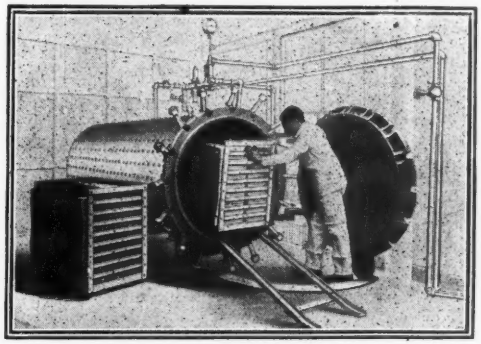

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Everything connected with B & B products is the very epitome of modern efficiency. And every department is in active charge of an owner of the concern,

We are making surgical dressings as you want them made. The best that men know is embodied in them.

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Please find out, for our mutual good, that the B & B label signifies all that you seek.

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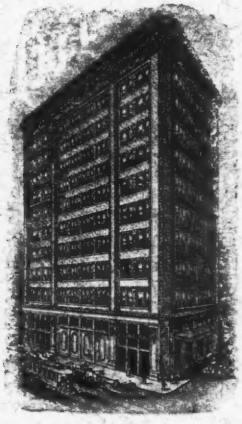

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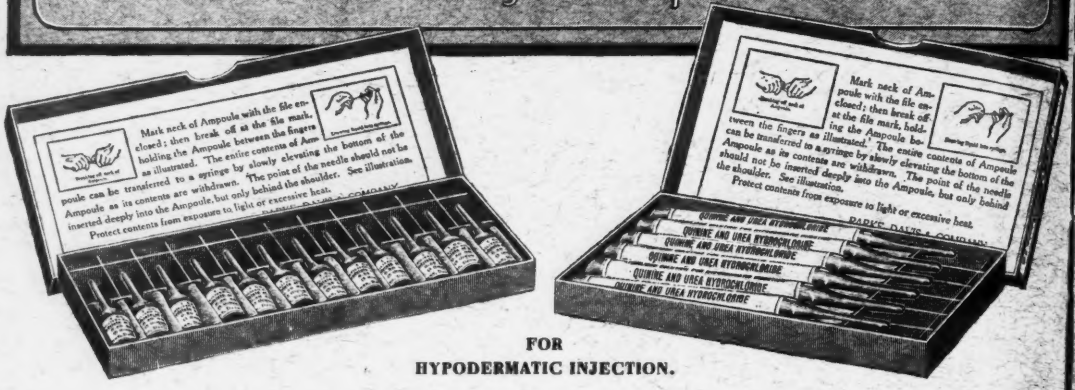
Mark neck of Ampoule with the file enclosed; then break off at the file mark, holding the Ampoule between the fingers as illustrated. The entire contents of Ampoule can be transferred to a syringe by slowly elevating the bottom of the Ampoule as its contents are withdrawn. The point of the needle should not be inserted deeply into the Ampoule, but only behind the shoulder. See illustration.
Protect contents from exposure to light or excessive heat.
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CACODYLATE OF SODIUM, an organic arsenical product, is offered as a superior substitute for the ordinary inorganic arsenical preparations. It has been administered with striking success in the treatment of

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